DOMINION OF CANADA

DEPARTMENT OF AGRICULTURE

DOMINION EXPERIMENTAL FARMS

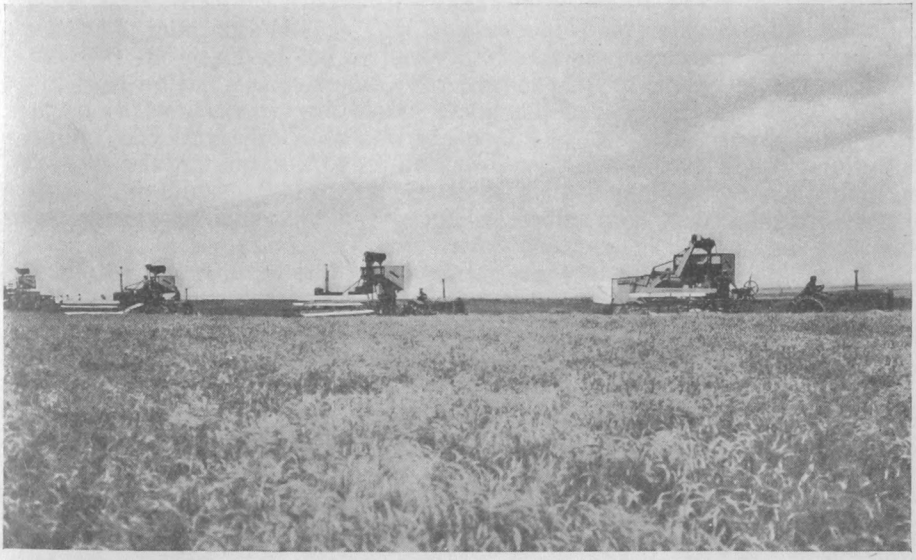
EXPERIMENTAL STATION

SWIFT CURRENT, SASK.

REPORT OF THE SUPERINTENDENT

J. G. TAGGART, B.S.A.

FOR THE YEAR 1928



Modern harvesting methods on the Prairies.

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DOMINION EXPERIMENTAL STATION, SWIFT CURRENT, SASK.

REPORT OF THE SUPERINTENDENT, J. G. TAGGART, B.S.A.

NOTES ON THE SEASON

After January 4, 1928, the winter was mild and open. Practically all snow disappeared by January 13. During the remainder of the winter, light falls of snow were recorded but open land such as bare fallow did not again receive a cover of snow that remained for more than a few days at a time. Temperatures ranged much above normal. Alternate freezing and thawing of the surface soil continued until near the end of April. This condition coupled with a complete lack of effective rains until June 16 made the surface of the land extremely dry and loose. Some soil drifting and much unevenness of germination of all spring grains resulted. Winter rye suffered serious damage from winter-killing and the dry spring destroyed any chance that this crop might have had to make a recovery. Consequently, the poorest rye crop in the history of the Station was harvested. Early growth of perennial hay crops and pastures was also retarded and yields seriously reduced by the dry spring. The rains of late June caused a considerable recovery of pasture grasses but hay crops had been damaged beyond the possibility of any great degree of recovery.

From June 20, spring grains made a remarkably rapid growth, but an unusually early frost on August 22 caught most wheat crops in this district in a somewhat immature state. This frost caused a very considerable reduction in both yield and grade of the majority of wheat crops. Corn, which had also been retarded by the spring drouth, was frozen when in a very green condition, so that it was practically worthless. Oats and barley, which were seeded in reasonably good time, produced fair yields.

From the beginning of August until the end of the year, the precipitation was remarkably light. This long period of almost continuously fine weather allowed farmers to carry on harvesting, threshing and marketing operations almost without interruption. All crops were saved in good condition and with very little loss apart from the frost damage already noted.

DATES OF FARM OPERATIONS, 1928

—	Began	Finished
Work on land (first and last dates)	April 23	Oct. 6
Seeding wheat	April 23	May 11
Seeding oats	May 11	May 15
Seeding corn	May 18	May 21
Seeding fall rye	Aug. 22	Aug. 24
Spring ploughing	April 23	May 15
Ploughing summer-fallow	May 11	June 11
Cutting hay	July 5	July 19
Cutting fall rye	July 30	Aug. 8
Cutting wheat	Aug. 13	Sept. 7
Cutting oats	Aug. 23	Aug. 31
Cutting corn	Aug. 24	Aug. 25
Operating Combine	Aug. 30	Oct. 1
Threshing	Sept. 11	Sept. 25
Fall ploughing	Oct. 3	Oct. 6

METEOROLOGICAL RECORD FOR SWIFT CURRENT, SASK., 1928

Month	Temperature			Precipitation	Evaporation	Sunshine	Wind
	High	Low	Mean	10 inches snow = 1 inch rain			Total miles
	°F	°F	°F	inches	inches	hours	
January	48	−28	15·8	0·27	.....	105	.....
February	51	−15	19·7	0·11	.....	139·5	.....
March	68	− 5	28·0	0·37	.....	174·5	.....
April	80	1	34·1	0·44	.....	165·7	.....
May	93	22	55·8	0·52	6·48	305·0	5,984
June	81	32	55·7	4·76	4·87	219·6	5,201
July	90	44	63·6	2·17	5·84	289·6	4,404
August	96	26	59·7	0·32	5·97	272·5	3,779
September	87	9	51·0	0·15	5·07	228·0	4,787
October	65	7	37·3	0·55	1·80	147·3	5,573
November	63	0	31·5	0·00	.....	145·1	.....
December	50	−33	20·0	0·44	.....	82·2	.....
Totals	.....	.....	.....	10·10	30·03	2,274·0	29,728

ANIMAL HUSBANDRY

Only one important change in Animal Husbandry policy took place during 1928; that was the replacement of Tamworth swine with Yorkshires. The change was made to conform with the swine policy of the Saskatchewan Department of Agriculture, which aims to promote only one breed of bacon hogs. The start of a breeding herd was made by purchasing two good young Yorkshire sows at the Regina spring sale of bred sows. In October a good young boar was secured from the Central Experimental Farm. By the autumn of 1929 it is hoped that good breeding stock will be available for sale to farmers.

HORSES

In the early spring one work horse was purchased from W. Caswell, of Success, Sask. Late in the year three of the old horses, which had passed their time of usefulness, were killed, leaving the number of effective work horses at sixteen.

CATTLE

The cattle on the Station consist of small breeding herds of Holsteins and Shorthorns.

HOLSTEINS

The Holstein herd is maintained for the purpose of securing information on the cost of production of milk and the cost of rearing young dairy stock. An incidental service of some importance is the sale of breeding stock to farmers. During the year five animals have been sold for breeding purposes and one for beef.

FEED COST AND MILK PRODUCTION RECORD

During the year five cows completed lactation periods. The following table contains a statement of costs and returns from these cows. Due to the great variation in the cost of such items, no statement of labour and housing costs is shown. A single figure covering the cost of all such items not included in the table would amount to from thirty to fifty dollars, depending on the number of animals kept and the type of building used.

DAIRY CATTLE—PRODUCTION AND FEED RECORD

Cow	Number of lactation period	Days in milk	Milk produced	Cost of feed and pasture	Value of milk	Profit over feed
			lb.	$ cts.	$ cts.	$ cts.
L. S. Butter Girl (68058)...	5th	387	16,188·1	117 49	242 82	125 33
Biddy "E" (grade).....	3rd	253	9,907·9	77 28	148 62	71 34
Diamond A 2 (grade).....	7th	245	6,822·7	86 45	102 34	15 89
Korndyke Francy Bos (132258).....	2nd	297	5,886·4	78 37	88 29	9 92
Korndyke Francy May (115102).....	3rd	200	6,119·3	88 98	91 78	2 90
Averages.....	.....	276	8,984·9	89 71	134 77	45 07

SHORTHORNS

The Shorthorn cattle are carried on a straight beef basis. When animals are sold for breeding, their value as beef is estimated and that value is credited to the herd. Due to higher beef values, returns have been somewhat better than in former years, but it is still evident that it is difficult to keep a breeding herd of beef cattle profitably on arable land. Three breeding animals were sold during the year.

FIELD HUSBANDRY

Field Husbandry experiments followed closely the projects of previous years. One new project was undertaken in co-operation with the Entomological Branch with a view to securing further information on sawfly control. Co-operative work with the Consolidated Mining and Smelting Company and the Canadian Pacific Railway Company was undertaken for the purpose of testing the values of superphosphates for wheat growing. Further studies of root-rots of wheat are in progress. No definite information is available from our records of any of these projects but the work is being continued. Experiments which have been carried out for a number of years are reported in the following pages.

SEVEN-YEAR ROTATION—9-ACRE FIELDS

Summary of yields, value and profit and loss per acre

Rotation year	Crop	Yield per acre		Value of crop 1928	Cost of production 1928	Profit or loss per acre	
		1928	Average six years			1928	Average six years
		bush. or tons	bush. or tons	$ cts.	$ cts.	$ cts.	$ cts.
1	Corn.....	2·37	3·76	7 11	11 40	−4 29	0 57
2	Wheat (grass seeded).....	33·0	24·6	30 70	13 62	17 08	15 62
3	Hay.....	1·1	1·16	11 00	9 08	1 92	3 18
4	Hay and fallow.....	0·8	0·7	8 00	3 84	4 16	2 33
5	Wheat.....	33·0	23·8	30 70	18 35	12 35	11 25
6	Fallow.....	.....	.....	.....	.....	.....	.....
7	Fall rye.....	10·2	24·9	8 12	14 96	−6 84	2 85
	Totals for rotation.....	.....	.....	95 63	71 57	24 06	35 80
	Average per acre.....	.....	.....	13 66	10 22	3 44	5 11

The corn was a rather poor stand which was made poorer by frost on August 23. The prolonged dry period of May and June affected the growth of hay, particularly the first-year crop. Sweet clover in this crop was in bloom when eight to ten inches high. The rains of late June caused a fair growth of brome and western rye grass.

The wheat crops were very good and matured early enough to escape any appreciable frost damage. Fall rye was badly winter-killed. Russian thistle and pigweed grew profusely in the open spaces.

THREE-YEAR ROTATION—FALLOW: WHEAT: WHEAT

Rotation year	Crop	Yield per acre		Value of crop 1928	Cost of production 1928	Profit or loss per acre	
		1928	Average five years			1928	Average five years
		bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
1	Fallow						
2	Wheat	36·8	27·1	33 12	17 32	15 80	15 74
3	Wheat	26·8	17·8	24 12	15 60	8 52	7 38
	Totals for rotation			57 24	32 92	24 32	23 12
	Average per acre			19 08	10 97	8 11	7 71

Notwithstanding the frost damage, this rotation gave a very fair return. The grade was reduced to No. 3, but it is evident that the yield was not greatly affected. The summer-fallow crop was so badly lodged and tangled that the binder was operated with great difficulty. After threshing, this field was raked and yielded an additional two bushels per acre.

TWO-YEAR ROTATION—FALLOW: WHEAT

Summary of yields, value and profit and loss per acre

Rotation year	Crop	Yield per acre		Value of crop 1928	Cost of production 1928	Profit or loss per acre	
		1928	Average six years			1928	Average six years
		bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
1	Fallow						
2	Wheat	29·8	22·2	26 82	19 69	7 13	10 08
	Totals for rotation			26 82	19 69	7 13	10 08
	Average per acre			13 41	9 84	3 57	5 04

The above field was quite free from weeds and gave a fair yield of wheat grading No. 2. It will be noticed that the fallow, wheat rotation has produced a lower average yield than the fallow, wheat, wheat rotation. This difference is undoubtedly due to the inferiority of the land upon which the alternate fallow and wheat rotation is located. In the plots where similar comparisons can be made on more uniform land, the fallow in the two-year rotation tends to be slightly more productive than in the three-year rotation.

TWO-YEAR ROTATION—FALLOW: FALL RYE

Summary of yields, value and profit and loss, per acre

Rotation year	Crop	Yield per acre		Value of crop 1928	Cost of production 1928	Profit or loss per acre	
		1928	Average six years			1928	Average six years
		bush.	bush.	$ cts.	$ cts.	$ cts.	$ cts.
1	Fallow	.....	.....	.....	.....	.....	.....
2	Fall rye	8·42	23·6	6 74	15 31	−8 57	0 98
	Totals for rotation	.....	.....	6 74	15 31	−8 57	0 98
	Average per acre	.....	.....	3·37	7 65	−4 28	0 49

This crop was badly winter killed. In all spaces where the crop was killed Russian thistle and pigweed grew abundantly. In years when rye was not winter killed practically no weeds of any kind could be found in the crop.

YIELDS OF WHEAT ON PACKED AND UNPACKED LAND

Field	Crop	Treatment	Yield per acre	
			1928	Average six years
			bush.	bush.
1	Wheat	Fallow cultipacked, seeded and packed	35·5	30·1
2	"	Standard fallow, no packing, seeded	31·7	28·6
3	"	Fallow surface packed, seeded and packed	35·5	27·6
1	Wheat	Spring-ploughed, cultipacked, seeded and packed	20·9	22·0
2	"	Spring-ploughed, no packing, seeded and harrowed	19·2	19·9
3	"	Spring-ploughed, surface packed, seeded and packed	20·9	20·5

The figures indicate a slight advantage in using the packer. It was thought that this might be due to soil variation rather than to the packer, so that the relative positions of the treatments in the fields have been changed in order to settle this point. This year the differences in yield followed the packer rather than the land.

YIELDS OF WHEAT FOLLOWING DIFFERENT STUBBLE TREATMENTS

Field	Crop	Treatment	Yield per acre	
			1928	Average six years
			bush.	bush.
1	Wheat	Fall-ploughed, harrowed, seeded and harrowed	19·1	19·1
2	"	Fall-disked, spring-ploughed, harrowed, seeded and harrowed	18·8	21·3
3	"	Spring-ploughed, harrowed, seeded and harrowed	24·7	21·9
4	"	(Previous crop cut by Combine) spring-burned and seeded	24·2	20·3
5	"	(Previous crop cut by Combine) spring-burned, disked and seeded	29·6	21·7
6	"	Spring burned, disked, seeded and harrowed	25·7	20·6
7	"	Spring burned, ploughed, harrowed, seeded and harrowed	28·8	22·6
8	"	Spring disked, seeded and harrowed	23·2	18·3

NOTE.—The fallow crop is this experiment has averaged 35·3 bushels per acre.

In a period of six years fall ploughing and spring disking have given a lower average yield than the other methods employed. When spring-disking is preceded by a good burn (the previous crop having been harvested by the combine) the yield is increased. Combine stubble that has been burned and seeded without any intervening treatment has produced slightly better yields than either fall ploughing or spring disking.

SUMMER-FALLOW TREATMENTS FOR WHEAT PRODUCTION

Field	Crop	Fallow treatment	Yield per acre	
			1928	Average five years
			bush.	bush.
1	Wheat	Fall-ploughed, cultivated during fallow year	34·5	22·9
2	"	Fall-disked, cultivated during fallow year	39·5	26·5
3	"	Cultivated only during fallow year	39·8	26·4
4	"	Cultivated till July 15, ploughed	37·3	26·0
5	"	Ploughed 6" deep June 15, cultivated	35·8	26·2
6	"	Sweet clover ploughed June 15, cultivated	34·0	25·1

Over a period of five years fall ploughing the summer-fallow has given a lower average yield of wheat than any other treatment. Apart from this treatment it would appear that the most important item in summer-fallowing is to germinate weed seeds and destroy the weeds before they have consumed any appreciable amount of moisture. The method of doing so that involves the least expenditure is obviously the best summer-fallow treatment, provided that the land is not left in a condition which will promote soil drifting.

SUMMER-FALLOW TREATMENTS FOR WHEAT PRODUCTION

1/50-acre Plots—Triplicated

No.	Treatment	Yield per acre	
		1928	Average four years
		bush.	bush.
1	Fall ploughed, cultivated in fallow year	35·4	30·1
2	Fall disked, cultivated in fallow year	33·3	29·7
3	Cultivated as required to July 15, ploughed and left untilled	33·8	29·3
4	Ploughed June 10, 6 inches, cultivated as required	33·5	29·3
5	Cultivated only during fallow year	31·3	29·4
6	Ploughed June 10, 6 inches, sown 5 pounds sweet clover with 1st year wheat	30·0	29·2
7	Spring burned, disked, ploughed June 10, cultivated as required	32·5	29·9
8	Disked early, ploughed June 10, cultivated as required	29·8	29·4
9	Ploughed June 10, 4 inches, cultivated as required	33·6	30·2
10	Ploughed June 10, 6 inches, cultivated as required	30·7	29·8
11	Ploughed June 10, 6 inches, subsoiled 4 inches, cultivated as required	29·2	28·6
12	Ploughed May 15, cultivated as required	31·6	29·2
13	Cultivated only, both stubble and fallow crops	28·0	27·0

The very small variation in yield from plot to plot in this experiment bears out the idea that weed control is the great desideratum and that the methods of cultivation to attain this end are of minor importance. It should be noted that all methods used in this experiment provide for the early destruction of weeds. All plots, unless directions are otherwise, are ploughed for the second-year crop.

No.	Plot treatment	Yield per acre	
		1928	Five-year average
		bush.	bush.
1	Fall ploughed, spring harrowed, seeded, harrowed	15·6	22·0
2	Fall disked, spring ploughed, harrowed, seeded, harrowed	12·7	22·0
3	Spring ploughed 4 inches, harrowed, seeded, harrowed	18·9	22·9
4	Spring burned, disked, seeded, harrowed	20·8	23·3
5	Spring burned, spring ploughed, harrowed, seeded, harrowed	14·4	21·6
6	Spring disked, seeded, harrowed	13·4	21·3
7	Spring burned, seeded, harrowed	18·2	21·6
8	Sown in stubble, harrowed	9·3	15·1
9	Spring burned, ploughed 7 inches, harrowed	18·9	23·1
10	Spring burned, ploughed 4 inches, subsoiled 6 inches, harrowed, seeded, harrowed	22·1	24·1
11	Fall burned, spring ploughed 4 inches, harrowed, seeded, harrowed	16·9	24·0
12	Fall burned, spring disked, seeded, harrowed	20·0	25·2
13	Spring burned, cultivated, harrowed, seeded, harrowed	23·9	22·9

It will be at once noticed that the 1928 yields from these stubble treatment plots are lower and more varied than the five-year average figures. The spring of 1928 was so dry that any treatment which accelerated the loss of even small amounts of moisture, or which left the land in an unusually loose condition, was followed by an uneven stand of grain and a comparatively low yield. Burning of stubble and trash prior to any other work preparatory to seeding showed marked advantage. The good effect of the burning this year was not wholly due to the destruction of weed seeds with the consequent reduction of weed growth in the crop, but partly as well to the fact that land which had been entirely cleared of trash by burning could be put in shape for seeding with less work and seeded more evenly than land which had not been burned. While the variation in the 1928 yields cannot be correlated with the one factor of burning, it was evident from observation of the germination and growth on the various plots that burning did have a very beneficial effect this year.

COMMERCIAL FERTILIZERS FOR WHEAT

In the spring of 1927 an experiment in the use of commercial fertilizers for wheat was undertaken. It was not expected that the application of fertilizer would produce any marked increase in yields but the work was undertaken rather with a view to obtaining more information on the general question of soil fertility when land is kept in a grain growing rotation for a considerable period of time. The land used in this experiment was broken in 1923 and had grown two crops of grain and one of corn before this experiment was undertaken.

The work is conducted on duplicate fiftieth-acre plots. Check plots receiving no fertilizer are equal in number to the treated plots. Prior to the application of any fertilizers, samples of the soil were taken in order that changes in fertility may be determined from samples taken after the experiment has been conducted for some years.

The fertilizers used are sodium nitrate, superphosphate and muriate of potash. Each of these is applied alone at two rates on both fallow and stubble crops and in a third series each fertilizer is applied to both first and second crops in a three-year rotation of fallow, wheat, wheat. The final phase of the experiment is the application of the three fertilizers in combination under the same set of conditions as prevail where the fertilizers are used singly.

The data for the two years during which the experiment has run, are presented in the accompanying table. So far it is not possible to state that the fertilizers have had any definite influence on yields.

COMMERCIAL FERTILIZERS FOR WHEAT

Rate of application per acre	Yield per acre		
	1927	1928	Two-year average
	bush.	bush.	bush.
Nitrate of Soda for Wheat applied on Fallow—			
No fertilizer (check)	36·4	30·1	33·2
50 pounds	37·3	30·3	33·8
100 pounds	36·7	29·5	33·1
No fertilizer (check)	37·2	30·2	33·7
Nitrate of Soda for Wheat applied on Spring Ploughing—			
No fertilizer (check)	28·0	17·9	22·9
50 pounds	28·0	19·2	23·6
100 pounds	27·6	16·8	22·2
No fertilizer (check)	28·0	17·4	22·7

—	Yield per acre					
	Wheat on fallow			Wheat on spring ploughing		
	1927	1928	Two-year average	1927	1928	Two-year average
	bush.	bush.	bush.	bush.	bush.	bush.
Nitrate of Soda applied on both Fallow and Spring Ploughing—						
No fertilizer (check)	34·7	30·6	32·6	27·5	34·4	30·9
50 pounds	34·7	32·6	33·6	29·7	16·8	23·2
100 pounds	34·8	34·3	34·5	27·8	15·9	21·8
No fertilizer (check)	34·3	34·6	34·4	26·7	16·6	21·6

COMMERCIAL FERTILIZERS FOR WHEAT

Rate of application per acre	Yield per acre		
	1927	1928	Two-year average
	bush.	bush.	bush.
Superphosphate for Wheat applied on Fallow—			
No fertilizer (check)	37·4	30·5	33·9
50 pounds	36·2	32·5	34·3
100 pounds	37·9	35·9	36·9
No fertilizer (check)	37·2	32·1	34·6
Superphosphate for Wheat applied on Spring Ploughing—			
No fertilizer (check)	26·4	24·5	25·4
50 pounds	26·2	19·7	22·9
100 pounds	28·2	18·0	23·1
No fertilizer (check)	30·9	16·6	23·7

—	Yield per acre					
	Wheat on fallow			Wheat on spring ploughing		
	1927	1928	Two-year average	1927	1928	Two-year average
	bush.	bush.	bush.	bush.	bush.	bush.
Superphosphate applied on both Fallow and Spring Ploughing—						
No fertilizer (check)	36·5	32·5	34·5	31·3	15·1	23·2
50 pounds	36·8	33·0	34·9	22·9	18·8	20·8
100 pounds	37·0	36·5	36·7	29·0	20·1	24·5
No fertilizer (check)	33·7	36·0	34·8	27·0	19·5	23·2

COMMERCIAL FERTILIZERS FOR WHEAT

Rate of application per acre	Yield per acre		
	1927	1928	Two-year average
	bush.	bush.	bush.
Muriate of Potash for Wheat applied on Fallow—			
No fertilizer (check)	33·2	31·2	32·2
25 pounds	35·9	32·1	34·0
50 pounds	35·3	33·8	34·5
No fertilizer (check)	37·1	33·7	35·4
Muriate of Potash for Wheat applied on Spring Ploughing—			
No fertilizer (check)	27·8	22·4	25·1
25 pounds	28·7	20·2	24·4
50 pounds	28·5	19·5	24·0
No fertilizer (check)	28·9	22·0	25·4

—	Yield per acre					
	Wheat on fallow			Wheat on spring ploughing		
	1927	1928	Two-year average	1927	1928	Two-year average
	bush.	bush.	bush.	bush.	bush.	bush.
Muriate of Potash applied on both Fallow and Spring Ploughing—						
No fertilizer (check)	36·6	31·3	33·9	29·8	20·7	25·2
25 pounds	36·3	31·7	34·0	29·9	21·1	25·5
50 pounds	36·2	30·6	33·4	30·3	24·1	27·2
No fertilizer (check)	36·6	32·2	34·4	29·0	23·5	26·2

COMMERCIAL FERTILIZERS FOR WHEAT

Rate of application per acre	Yield per acre		
	1927	1928	Two-year average
	bush.	bush.	bush.
Combination of Superphosphate, Nitrate of Soda and Muriate of Potash applied on Fallow—			
No fertilizer (check)	34·2	34·1	34·1
50 nitrate; 50 phosphate; 25 potash	36·0	32·6	34·3
100 nitrate; 100 phosphate; 50 potash	36·3	31·6	33·9
No fertilizer (check)	34·6	30·0	32·3
Combination of Superphosphate, Nitrate of Soda and Muriate of Potash applied on Spring Ploughing—			
No fertilizer (check)	25·3	18·9	22·1
50 nitrate; 50 phosphate; 25 potash	30·0	18·4	24·2
100 nitrate; 100 phosphate; 50 potash	32·6	17·7	25·1
No fertilizer (check)	29·7	18·1	23·9

—	Yield per acre					
	Wheat on fallow			Wheat on spring ploughing		
	1927	1928	Two-year average	1927	1928	Two-year average
	bush.	bush.	bush.	bush.	bush.	bush.
Combination of Superphosphate, Nitrate of Soda and Muriate of Potash applied both on Fallow and on Spring Ploughing—						
No fertilizer (check)	36·5	29·2	32·8	30·8	15·5	23·1
50 nitrate; 50 phosphate; 25 potash	37·2	32·1	34·6	30·6	16·8	23·7
100 nitrate; 100 phosphate; 50 potash	40·7	31·4	36·0	29·9	17·0	23·4
No fertilizer (check)	37·3	29·9	36·6	28·8	18·5	23·6

Fallow substitutes	1928 Yield per acre			Seven-year average Yield per acre		
	Grain	Fodder, green weight	Fodder, dry weight	Grain	Fodder, green weight	Fodder, dry weight
	bush.	tons	tons	bush.	tons	tons
Potatoes—rows 42 inches by 18 inches...	176·9	.....	.....	147·2	.....	.....
Millet—double rows*.....	.....	4·22	1·24	.....	*	*
Sunflowers—hills 42 inches by 42 inches.	.....	10·09	2·06	.....	11·15	2·03
Corn—hills 42 inches by 42 inches.....	.....	3·74	0·64	.....	6·59	1·22
Oats—Triple rows.....	66·9	.....	.....	48·4	.....	.....
Oats—Double rows.....	53·3	.....	.....	41·6	.....	.....
Oats—Sown half bushel per acre.....	31·2	.....	.....	41·7	.....	.....
Wheat—Double rows.....	10·0	.....	.....	10·2	.....	.....
Oats—Sown 2 bushels per acre, June 6, for green feed.....	.....	1·99	0·76	.....	4·12	1·18
Barley—Double rows.....	40·3	.....	.....	24·5	.....	.....

*Sudan grass was grown during the first five years of the test, but due to its slow habit of growth, weed competition was always a serious factor and only low yields of fodder could be obtained. Millet was substituted in 1927 when it failed for the same reason.

Weed growth within the rows of grain constitutes the greatest objection to intertilled row crops in this territory. It is possible by three or four cultivations in the season to keep down weeds between rows but only hand-pulling or hoeing will keep such weeds as Russian thistle, lambs quarters and French weed from growing in the row of grain. It is not economically possible to remove these weeds by hand, consequently the object of the fallow substitute—weed control—is not obtained.

78827—3¼

Yields per Acre of Fallow Substitutes and Succeeding Wheat Crops

Crop	1922		1923	1923		1924	1924		1925	1925		1926	1926		1927	1927		1928	6-year average		
	Fallow substitute		Wheat	Fallow substitute		Wheat	Fallow substitute		Wheat	Fallow substitute		Wheat	Fallow substitute		Wheat	Fallow substitute		Wheat	Fallow substitute		Wheat
	Green weight	Dry weight		Green weight	Dry weight		Green weight	Dry weight		Green weight	Dry weight		Green weight	Dry weight		Green weight	Dry weight		Green weight	Dry weight	
	tons	tons	bush.	tons	tons	bush.	tons	tons	bush.	tons	tons	bush.	tons	tons	bush.	tons	tons	bush.	tons	tons	bush.
Sudan grass, double rows...	3·6	0·9	11·0	4·7	1·2	25·3	2·8	0·7	15·9	Fai	led	14·4	Fai	led	30·7	Fai	led	24·2	.....	.....	20·2
Sunflowers.....	12·3	1·8	17·0	16·7	2·3	15·0	10·9	2·7	14·8	10·4	1·9	9·6	7·3	1·3	33·5	10·4	2·3	19·1	11·3	2·0	18·1
Fallow.....	.....	.....	20·2	.....	.....	36·2	.....	.....	22·5	.....	.....	27·2	.....	.....	36·4	.....	.....	33·0	.....	.....	29·2
Corn.....	9·2	1·6	12·4	9·4	1·7	29·2	8·3	1·4	18·5	5·4	1·4	22·1	8·1	1·4	33·9	2·1	0·5	31·3	7·1	1·3	24·5
Oats, sown late for green feed.....	4·6	1·2	5·2	6·9	2·2	17·5	5·5	1·3	16·4	2·4	0·7	11·7	2·4	0·7	29·2	4·9	1·4	9·7	4·5	1·3	14·9
		bush.			bush.			bush.			bush.			bush.			bush.			bush.	
Potatoes.....	.....	142·0	21·5	.....	261·1	30·4	.....	190·8	19·0	.....	120·5	18·1	.....	78·0	34·9	.....	61·4	24·5	.....	142·3	24·7
Oats, triple rows.....	.....	58·8	8·3	.....	53·4	19·5	.....	43·1	16·1	.....	32·6	10·8	.....	17·6	31·9	.....	66·5	22·0	.....	45·3	18·1
Oats, double rows.....	.....	50·6	9·8	.....	47·5	24·8	.....	29·3	14·5	.....	37·7	10·2	.....	16·0	31·9	.....	57·4	26·0	.....	39·7	15·6
Oats sown ½ bushel per acre	.....	62·3	7·0	.....	60·6	16·4	.....	26·3	12·8	.....	23·8	7·8	.....	8·8	29·7	.....	78·5	14·8	.....	43·4	14·7
Wheat, double rows.....	.....	18·7	8·4	.....	8·4	33·5	.....	11·9	12·8	.....	11·7	13·2	.....	5·4	28·9	.....	10·4	24·3	.....	11·1	20·2
Barley, double rows.....	.....	23·3	12·9	.....	11·3	27·3	.....	28·3	12·2	.....	21·5	11·1	.....	13·0	36·4	.....	34·3	23·5	.....	21·9	20·6

The above tabulation shows the yields of different fallow substitutes for the years 1922 to 1927 inclusive together with the yields of succeeding wheat crops for the years 1923 to 1928 inclusive. The average yields of substitutes and wheat crops are also shown at the end of the table. For purposes of comparison of grain crops sown in rows with regular seeding at the same rate per acre as the row crops, one light seeding of oats is included. Likewise the yield of wheat on fallow is shown for comparison with yields of wheat following different row crops.

An examination of these data reveals several points of some importance to farmers who may contemplate substituting some row crop for all or part of this fallow area. First, it should be noted that no row crop land has produced wheat crops equal to those produced on fallow. Potatoes and corn have been the best fallow substitutes. Wheat following these crops has been about five bushels per acre less than on fallow. When cereals in rows are substituted for fallow the result has been a wheat yield in the next year about equal to the yield secured from spring-ploughed wheat stubble. It would appear, therefore, that cereals grown in cultivated rows use moisture to about the same extent as an ordinary seeding of the same cereal. Another point of considerable importance is that it has been found impossible, without hand labour, to keep row crops free of weeds, thus losing an important advantage of a clean fallow in destroying weeds.

Since potatoes and corn—the only crops which can be regarded as even partial fallow substitutes—cannot be grown on any large acreage for economic reasons, we are forced to conclude that any considerable substitution of row crops for fallow is not sound practice in southwestern Saskatchewan at the present time.

To throw further light on this problem it may be useful to compare total yields of wheat from a given area when different proportions of the land are devoted to fallow or fallow substitutes. The following table contains data taken from the fallow substitute experiment and adjacent plots.

YIELDS OF WHEAT IN DIFFERENT ROTATIONS

—	Part of area in crop	Four-year average yield per acre	
		Cropped area	Total area of rotation
		bush.	bush.
Continuous wheat on spring ploughing	All	12·0	12·0
Two-year—fallow substitute, wheat	All	16·0	16·0
Two-year—fallow, wheat	Half	29·4	14·7
Three-year—fallow, wheat, wheat	Two-thirds	26·7	17·8

From the above table it will be observed that, when the total yield of wheat is applied to the total area in the rotation, fallow included, the average yield per acre is highest on the three-year rotation and lowest on the continuously cropped area. It is true that the yield per acre is not the only factor to consider. Such matters as seed, twine and harvesting expense will vary on the different rotations somewhat in proportion to the area actually under crop. When allowance is made for these factors the result is to raise the relative value of the rotations containing the greater proportions of straight fallow because on these rotations less seed is used; the labour for seeding and harvesting is less and the amount of twine used is smaller. The amount and kind of equipment available for the acreage that must be cultivated must also be taken

into account. When all factors are considered it is evident that only exceptional conditions would justify departure from the established practice of devoting two-thirds of the land to wheat and one-third to fallow.

YIELDS OF FODDER CORN AND SUNFLOWERS PLANTED IN HILLS AND BY ROWS

Variety	Method	Spacing or plants per hill	Height when cut	1928 yield		Four-year average yield	
				Green weight	Dry weight	Green weight	Dry weight
		in.	in.	tons	tons	tons	tons
Fodder Corn—							
Minnesota No. 13	Rows 42 inches apart....	6	64½	16·88	2·90	9·39	1·77
		12	64	12·22	1·98	8·48	1·75
		18	63	10·95	1·84	8·06	1·37
		plants					
	Hills 42 inches by 42 inches.	2	60	7·55	1·41	7·79	1·36
		4	61	8·14	1·48	7·51	1·53
		in.					
Gehu.....	Rows 42 inches apart....	6	51½	14·67	2·70	8·91	1·87
		12	49	8·64	1·45	8·41	1·52
		18	49	8·33	1·33	7·92	1·35
		plants					
	Hills 42 inches by 42 inches.	2	49	6·15	1·23	6·47	1·39
		4	51	6·40	1·28	7·83	1·63
						Five-year average yield	
Sunflowers—		in.					
Russian Giant...	Rows 42 inches apart....	6	63½	12·74	2·55	10·47	2·34
		12	62½	8·75	1·81	9·25	1·88
		18	59½	6·33	1·21	8·29	1·76

The largest yields are obtained from thickest planting whether in hills or rows. Under favourable moisture conditions close or thick planting is feasible, but under dry conditions corn especially would be very short and difficult to harvest. As a rule, for corn, the hill system of planting is to be preferred to the row system, since weeds can be much more easily controlled by cultivating a field in two directions.

SEQUENCE OF CROPS

Preceding Crop	1928 crop	Yield per acre, 1928	Average yield per acre for five years
		Grain	Grain
		bush.	bush.
Wheat	Wheat	20·5	17·7
Fallow	Wheat	34·3	28·8
Millet	Wheat	34·6	21·0
Corn	Wheat	36·8	27·2
Peas	Wheat	28·0	17·8
Oats	Wheat	14·5	15·2
Wheat	Oats	53·6	37·4
Fallow	Oats	72·2	60·7
Millet	Oats	54·6	36·2
Corn	Oats	77·6	54·4
Peas	Oats	51·3	35·0
Oats	Oats	45·0	32·0
		(*)*Cured Fodder*	(*)*Cured Fodder*
		tons	tons
Wheat	Millet	*0·70	1·73
Fallow	Millet	1·29	2·25
Millet	Millet	*1·32	1·16
Corn	Millet	1·63	2·40
Peas	Millet	*0·08	1·51
Oats	Millet	*0·52	1·56
Wheat	Peas	1·13	†1·24
Fallow	Peas	1·77	†1·88
Millet	Peas	2·06	†1·99
Corn	Peas	2·44	†2·30
Peas	Peas	1·24	†1·69
Oats	Peas	1·12	†1·46
		Green Weight	*Green Weight*
Wheat	Corn	1·85	1·36
Fallow	Corn	2·03	1·55
Millet	Corn	1·18	1·20
Corn	Corn	1·12	1·68
Peas	Corn	1·07	1·19
Oats	Corn	1·64	1·16

(*) Cured weight based on uniform moisture content of 12 per cent.
*Yields from single plot only.
†Two-year average.

It will be noted in this experiment that the yields of wheat on fallow and after different crops do not stand in the same order as they do in the five-year average. Yields of wheat after corn and millet are much higher than would usually be expected. The reason for this apparently is the fact that both millet and corn were destroyed by frost on August 8, 1927, thereby leaving a considerable reserve of moisture in the soil. The oat crop in 1927 was good, while the crops following oats in 1928 are correspondingly poor.

RATES AND DATES OF SOWING MILLET

1/100-acre Plots—triplicated. Sown on ploughed wheat land

Rate sown per acre	Date sown	Stand	Height at harvest	Yield, per acre
lb.			inch.	tons
5	May 20	Thin	19	1·01
15	"	Thin	19	1·32
25	"	Thin	23	1·14
5	June 3	Normal	20	1·09
15	"	Normal	20	1·52
25	"	Normal	21	1·41
5	June 15	Normal	24	0·98
15	"	Normal	22	1·22
25	"	Normal	22	0·95

Best yields and greatest freedom from weeds resulted from the early June seedings. The rate of 15 pounds per acre yielded somewhat more than either a higher or lower rate. Early-sown millet is usually very weedy because of its slow growth while temperatures are low. On the other hand, very late seeding is likely to be damaged by early fall frosts.

RATES AND DATES OF SEEDING FALL RYE

Rate	Date sown	Date of ripening	Height at harvest	Yield of grain per acre	Average for five years
			inch	bush.	bush.
¾ bushel per acre	July 15	Aug. 10	29	4·9	22·5
1 "	" 15	" 10	29	7·0	22·0
1¼ "	" 15	" 10	28	6·8	18·3
1½ "	" 15	" 10	28	7·2	23·8
1 "	Aug. 1	" 10	33	16·7	29·7
¾ "	" 15	" 10	30	7·3	30·7
1 "	" 15	" 10	38	21·1	33·5
1¼ "	" 15	" 10	33	15·6	33·4
1½ "	" 15	" 10	34	17·4	33·4
¾ "	Sept. 1	" 10	44	25·1	34·6
1 "	" 1	" 10	42	26·2	35·2
1¼ "	" 1	" 10	40	26·2	34·2
1½ "	" 1	" 10	38	24·9	35·8
1 "	" 15	" 10	41	25·8	30·5
1 "	Oct. 1	" 10	45	18·8	26·2

Nineteen hundred and twenty-eight yields of fall rye, no matter what the rate, date or method of seeding, were much below the average. It is quite evident that the adversities of the season were much more damaging to the very early and very late seedings than to seeding made about September 1. This fact has been noted in previous years but usually differences have been less striking than was the case this year. Rate of seeding has had a much less marked influence on yields than date of seeding.

PLACE IN ROTATION TO SEED FALL RYE

Preceding crop or treatment	Height at harvest	Yield of grain per acre	
		1928	Five-year average
	inch.	bush.	bush.
Seed on fallow	35	19·7	32·4
Seed on ploughed barley stubble	32	6·2	19·2
Seed on ploughed sod	29	7·6	19·1
Seed on wheat stubble	26	7·9	17·4
Seed on fallow	35	20·8	32·6
Seed with oats	Failed		13·8
Seed after sunflowers cut	31	9·3	16·2
Seed rye after rye	30	7·1	15·6
Seed on fallow	33	17·0	31·7
Seed after corn cut	34	15·2	21·8
Seed one month after oats sown	25	5·4	17·6
Seed between rows of corn	31	15·6	23·0
Seed between rows of sunflowers	33	9·8	20·3

All rye crops in 1928 were much below the average in yield. Crops following fallow and corn were the only ones which produced even fair yields. The rye following corn and that seeded between corn rows had the unusual advantage of having the corn frozen off early in August, so that these seedings became well established in the fall of 1927.

DATES OF PLANTING CORN AND SUNFLOWERS

Date planted	Date first plants emerged	Height at harvest	Yield per acre 1928		Five-year average Yield per acre	
			Green weight	Dry weight	Green weight	Dry weight
		in.	tons	tons	tons	tons
Minnesota No. 13 Corn—						
May 1	June 7	51½	3·92	0·66	6·12	1·15
May 10	June 11	56½	8·31	1·06	7·64	1·55
May 20	June 11	49	4·35	0·77	7·28	1·47
May 30	June 24	49	4·14	0·68	7·02	1·18
June 9	July 1	47½	3·73	0·62	7·24	0·98
Russian Giant Sunflowers—					Six-Year average	
May 1	June 11	65	10·38	2·12	13·93	2·63
May 20	June 11	62½	8·75	1·82	11·66	2·10
June 9	June 28	52	5·40	1·12	7·07	1·23

This experiment is conducted in a two-year rotation with either corn or sunflowers rotating with wheat. The earliest planting required from five to six weeks before the seedlings showed above ground. This was mostly due to dry soil conditions. Wireworms destroyed much of the sunflower seed. During normal seasons May 10 to 20 is a good time to plant corn. Sunflowers should generally be planted earlier than this.

DATES OF SEEDING GRASSES AND LEGUMES

Date seeded	Yield per acre 1928		Four-year average yield per acre	
	Brome western rye alfalfa	Sweet clover	Brome western rye alfalfa	Sweet clover
	tons	tons	tons	tons
May 1	0·75	1·65	0·94	1·45
May 15	0·61	1·70	0·88	1·28
May 30	1·03	2·18	0·93	1·84
June 15	1·19	2·18	1·44	1·88
July 1	1·34	2·04	1·95	1·29
Oct. 1	Failed	Failed	*	*
Oct. 15	†	Failed	*	*

*In test two years only and failed each year.
†Not in test.

The chief purpose of this experiment is to discover how late in the season grasses and clovers may be sown with any reasonable assurance of getting a statisfactory stand.

Spring or fall ploughed stubble land is used in the experiment because under farm conditions such land which is due to be summer-fallowed is sometimes used for grass seeding. The method followed is to fall or spring plough the land, and surface work it as late in the season as the seeding can be safely delayed. This method makes possible the destruction of many weeds and if seeding is not delayed beyond July 1 a catch of grass is reasonably sure. In fact, in this experiment the later seedings particularly of the grasses have given better yields of hay in the year following seeding. The reason for this apparently is that the late-seeded grass makes a smaller growth in the year of seeding, hence less moisture is used and a larger reserve of moisture is left for the hay crop of the following year.

Under conditions where grasses, seeded with nurse crops of grain, fail because of the competition of the grain crop the method followed in this experiment is recommended.

PREPARATION OF LAND FOR HAY

1/100-acre plots triplicated

Plot treatment	Yield per acre brome and western rye	Yield per acre white sweet clover
	tons	tons
Fall plough, spring harrow, cultivate till seeding, seed, harrow	1·34	1·93
Fall plough, spring harrow, cultivate as required, harrow, pack, seed, pack	1·07	2·10
Spring plough early, harrow, cultivate as required, harrow, seed, harrow	1·10	2·23
Spring plough early, harrow, cultivate as required, harrow, pack, seed, pack	1·05	1·91
Plough about June 1, harrow, seed, harrow	1·02	2·08

This experiment was started last year for the purpose of determining the effects of time and manner of land preparation on the catch and yield of grasses and clovers. Since only one year's results are available, no conclusions can yet be drawn from this work.

SEVEN-YEAR ROTATION—OLD WEEDY LAND

Summary of yields, value and profit and loss, per acre

Rotation year	Crop	Yield per acre 1928	Yield per acre Average four years	Value of crop 1928	Cost of production 1928	Profit or loss per acre 1928	Profit or loss per acre Average four years
		bush. or tons	bush. or tons	$ cts.	$ cts.	$ cts.	$ cts.
1	Corn	.....	0·76	.....	7 95	−7 95	−7 31
2	Wheat-grass seeded	20·2	21·3	18 18	11 54	6 64	12 09
3	Hay	0·70	0·95	7 00	6 14	0 86	2 41
4	Hay and fallow	0·75	0·38	7 50	3 42	4 08	2 20
5	Wheat	25·2	19·2	22 69	16 96	5 73	5 02
6	Fallow	.....	.....	.....	.....	.....	.....
7	Fall rye	20·0	27·3	16 03	16 47	−0 44	2 34
	Totals for rotation	.....	.....	71 40	62 48	8 92	16 75
	Average per acre	.....	.....	8 92	10 20	1 27	2 39

The corn in this rotation has been a consistent failure. The stand is always thin and poor, apparently the result of wireworm damage. This season and in 1927 the crops were destroyed by frost, but had there been no frost the yield would not have been more than 1½ tons of ensilage per acre. The two wheat fields in this rotation produced fair crops. Wheat following corn was infested by pigweed. Some of the rye was winterkilled, but not nearly to the same extent as that on the Station. The rye crop was remarkably free from weeds.

THREE-YEAR ROTATION—OLD WEEDY LAND

Summary of yields, value and profit and loss (per acre)

Rotation year	Crop	Yield per acre 1928	Yield per acre Average three years	Value of crop 1928	Cost of production 1928	Profit or loss per acre 1928	Profit or loss per acre Average three years
		bush.	bush.	$	$	$	$
1	Fallow	.....	.....	.....	.....	.....	.....
2	Fall rye	22·0	26·6	17 62	14 84	2 78	5 54
3	Fall rye	9·6	13·8	7 66	10 45	−2 79	−0 49
	Total for rotation	.....	.....	25 28	25 29	−0 01	5 05
	Average per acre	.....	.....	8 43	8 43	.....	1 68

Rye grown on summer-fallow gave a fair yield and was free from weeds. The rye grown on stubble was very thin and badly infested with weeds. This is the first season in which rye has failed to produce a satisfactory crop. The causes of the partial failure are first winter killing and second the extreme drouth which prevailed from the early spring until June 16.

PLACE IN ROTATION TO SEED GRASSES AND CLOVERS

Crop	Weeds	Yield per acre cured hay, 12% moisture	
		1928	Six-year average
		tons	tons
Brome and western rye sown with first year wheat	Many	0·62	1·71
Brome and western rye sown between rows of corn	Nil	1·31	1·30
Brome and western rye sown alone on fallow	Nil	1·49	2·28
Brome and western rye sown alone on spring ploughing	Nil	1·37	1·86
Brome and western rye sown with first year wheat	Few	0·67	1·72
Brome and western rye sown in spring on fall rye	*	Failed	
Brome and western rye sown with second year wheat	Nil	0·67	1·05
White sweet clover sown with first year wheat	Nil	1·18	2·30
Brome and western rye sown with first year wheat	Many	0·70	1·64
White sweet clover sown between rows of corn	Nil	1·69	1·76
White sweet clover sown alone on fallow	Nil	1·39	1·86
White sweet clover sown alone on spring ploughing	.....	.....	*1·93
Brome and western rye sown with first year wheat	Few	0·84	1·47
White sweet clover sown in spring on fall rye	†	Failed	
White sweet clover sown with second year wheat	Many	1·73	1·60
Brome and western rye sown with first year wheat	Many	0·84	1·55

*Thin volunteer crop of fall rye and practically no stand of hay.
†Five-year average.

In this experiment the difference in yield from grasses and clovers seeded alone on fallow and alone on spring ploughing has not been important nor consistent. Yields from grass seedings made with wheat on fallow or wheat on spring-ploughed stubble have averaged somewhat lower than when seeded without a nurse crop, but the differences have not been sufficient to compensate for the loss of the wheat crop in the year of seeding the grass. The yields of sweet clover seeded with and without a nurse crop have shown less variation with the method than have the yields of grasses.

Apart from loss of grain crop, the greatest drawback to seeding grasses and clovers without a nurse crop is the growth of weeds which invariably springs up in the newly-seeded grass and clover. Since fair stands of grass and clover can usually be obtained by seeding with wheat or other grains this procedure seems more desirable when all factors are considered.

STUBBLE TREATMENTS—OLD WEEDY LAND

Field	Crop	Treatment	Yield per acre	
			1928	Average four years
			bush.	bush.
1	Wheat	Spring-ploughed, harrowed, seeded and harrowed	17·0	12·4
2	"	Spring-disked, seeded and harrowed	17·2	14·2
3	"	Spring-burned, disked, seeded and harrowed	17·0	14·8
4	"	Spring burned (harrow) disked, seeded and harrowed	17·7	15·5
5	"	Spring burned, disked, cultivated 15 days later, seeded and harrowed	15·8	10·7

Over a period of four years spring-burning with the harrows followed by disking has given a slightly better average yield than any other treatment used. It was noted this spring that surface working, with or without burning, followed immediately by seeding, insured a more even germination than did spring ploughing, or any type of preparation in which seeding was delayed.

HARROWING GROWING GRAIN CROPS—OLD WEEDY LAND

Field	Crop	Treatment	Yield per acre	
			1928	Average four years
		Fallow	bush.	bush.
B-13	Wheat	Early cultivated and seeded, harrowed just before crop is up	30·2	20·1
B-14	Wheat	Early cultivated and seeded, harrowed when crop is 4 inches high	19·3	19·4
B-15	Wheat	Early cultivated and seeded	29·0	20·0
		Spring-ploughed		
C-13	Wheat	Early cultivated and seeded, harrowed just before crop is up	19·6	14·4
C-14	Wheat	Early cultivated and seeded, harrowed when crop is 4 inches high	13·2	13·2
C-15	Wheat	Early cultivated and seeded	22·0	12·3

This year, on both summer-fallow and spring-ploughing, harrowing just before the crop came through the ground gave much better yields than harrowing when the crop was four inches high. In the latter case the crop was thinned to a considerable extent, thereby giving weeds which remained or which grew later a better chance to develop.

SUMMER-FALLOW TREATMENTS—OLD WEEDY LAND

Field	Crop	Treatment	Yield per acre	
			1928	Average four years
			bush.	bush.
B-6	Wheat	Ploughed June 15, cultivated as required	16·5	11·9
B-7	"	Cultivated only during fallow year	18·9	13·7
B-8	"	Ploughed, harrowed, oats seeded in triple rows	19·9	12·7
C-6	"	Spring ploughed, harrowed, seeded and harrowed	14·2	9·5
C-7	"	Spring-ploughed, harrowed, seeded and harrowed	12·7	10·4
C-8	"	Spring-ploughed, harrowed, seeded and harrowed	12·9	10·0

Cultivation of the summer-fallow without ploughing has maintained a higher average yield than has ploughed summer-fallow. The low yields on these fields are attributable to wireworm damage every year and to frost damage in 1927.

DEFERRED CULTIVATION AND SEEDING—OLD WEEDY LAND

Field	Crop	Treatment	Yield per acre	
			1928	Average four years
B- 9	Oats	Cultivated early, cultivated two weeks later, 2·5 bushels oats seeded	bush. 58·9	bush. 45·3
B-10	Wheat	Cultivated early, cultivated two weeks later, one bushel wheat seeded	20·3	8·8
B-11	Wheat	Normal date of cultivating and seeding	25·8	17·3
B-12	Wheat	Cultivated early, cultivated two weeks later, 1·25 bushels seeded	20·1	
C- 9	Oats	Spring-ploughed, cultivated two weeks later, 2·5 bushels oats seeded	29·4	33·2
C-10	Wheat	Spring-ploughed, cultivated two weeks later, one bushel wheat seeded	14·1	8·8
C-11	Wheat	Normal date of cultivating and seeding	18·9	11·2
C-12	Wheat	Spring-ploughed, cultivated two weeks later, one bushel wheat seeded	11·2	

Oats grown on summer-fallow in this treatment was a very fair crop and remarkably free from weeds. Wheat seeded at the normal time was superior in yield to that in which the seeding was deferred to allow for a second spring cultivation.

TESTS OF FARM MACHINES

COST OF SUMMER-FALLOWING BY THREE DIFFERENT METHODS

Two crops of wheat had been grown on this land. Half of the second crop had been cut with the combine and the stubble burnt off in the spring. The remaining half had been cut by the binder and was not burned. The land was divided into three parts in such manner that each field had an equal portion of both combine and binder stubble. Field 1 was ploughed by a three-bottom fourteen-inch gang plough; field 2 by a ten-foot one-way disk; half of field 3 was single disked by a twenty-four foot disk harrow and the remaining half was double-disked by the same implement. All this was done between the dates of June 7 and 11. This land was very weedy and it was assumed that if the use of the duckfoot cultivator was equally efficient in controlling subsequent weed growth in all three cases, then the varying costs of the initial treatment would determine the comparative value of each.

The following costs are for labour and fuel only:—

	per acre
(1) Ploughing with three-bottom gang, cost	$ 0 56
(2) Ploughing with one-way disk, cost	0 30
(3) Double-disking, cost	0 22
(4) Single-disking, cost	0 11

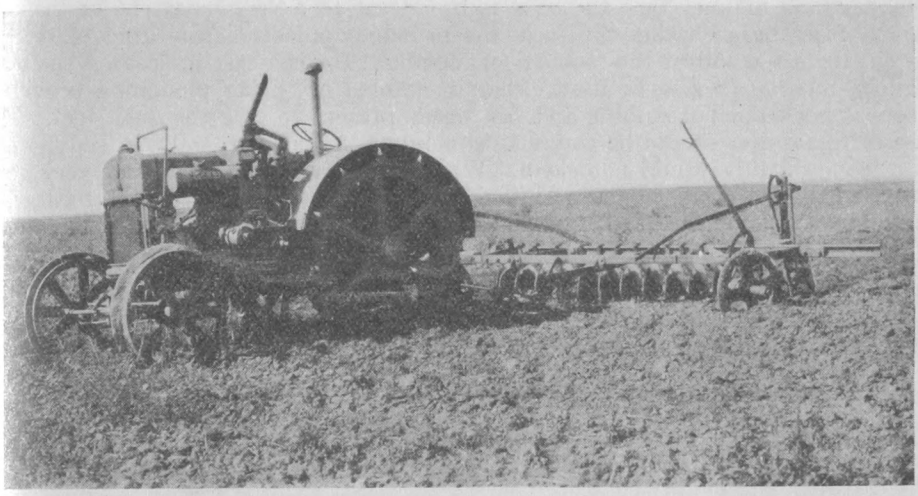
Neither the single nor the double disking was successful in killing all the weeds on the land at the time of the initial operation. Two weeks later when the duckfoot cultivator was used over the whole field, these weeds were so large and well rooted that the cultivator was unable to uproot any significant number of them. On the single-disked field this condition was so marked that it was necessary to go over it with the one-way disk. The condition of the crop grown on this area will have a definite bearing on the relative efficiency of these methods of summer-fallowing. At present it would appear that the gang plough and the one-way disk are equally efficient in destroying the early growth of weeds on summer-fallow land and in putting the land in such shape that the duckfoot cultivator can perform subsequent operations without undue difficulty. As the one-way disk does this work at almost half the cost of ploughing it is evident that this implement has a very definite and useful place on land not too heavy and sticky for its successful operation.

SEED DRILL TESTS

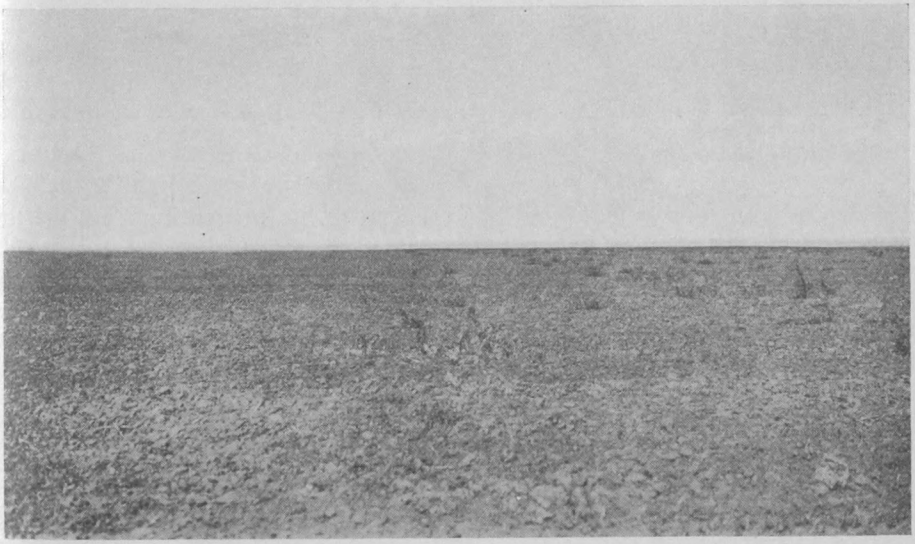
During the past spring a comparison was made of the value of a variety of seeding devices as compared with the ordinary double disk seed drill. The following types were tested:—

(1) Mitchell sub-seeder.
(2) The Kirchner seeder-plough.
(3) The Peoria plough drill.

The results from one season's work are not conclusive enough to warrant the publication of yields. The following is a description of the various machines and general observations thereon:—

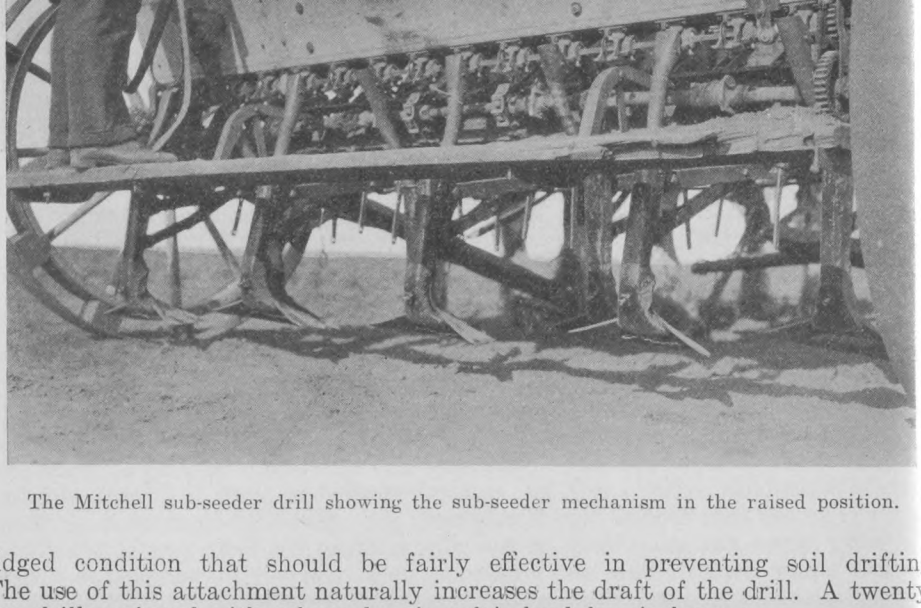


The one-way disk.



Summer-fallow on June 9. The left-hand part of the field was worked by the one-way disk and the right-hand part of the disk harrow. Note the weeds missed by the disk harrow.

THE MITCHELL SUB-SEEDER.—This consists of a number of duck feet, very similar to that of the ordinary duckfoot cultivator, with a hollow shank. The duck feet are attached to the seed drill in place of the ordinary furrow openers. At the heel of the duck foot is placed a fluted plate that scatters the falling seed in such manner that the seed is broadcast to a certain extent in the soil. Apart from broadcasting the seed, the principal object of this kind of drill is to cultivate the soil at the moment of seeding. It does best in seeding summer-fallow, but it can also be used either in stubble or spring ploughing providing there is not sufficient stubble and dry weeds present to clog the duck feet. The use of this seeder should be confined to mould-board plough soil. In heavier soil the feet probably would not clean. When properly adjusted it does very good work. Practically all weeds are killed at the time of seeding and the seed grain has an even start with all ungerminated weeds. The soil is left in a lumpy,

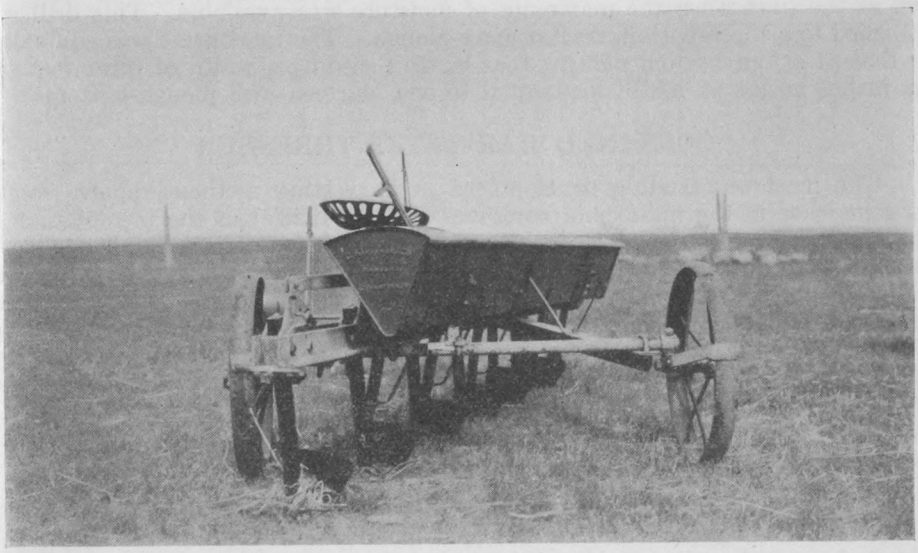


The Mitchell sub-seeder drill showing the sub-seeder mechanism in the raised position.

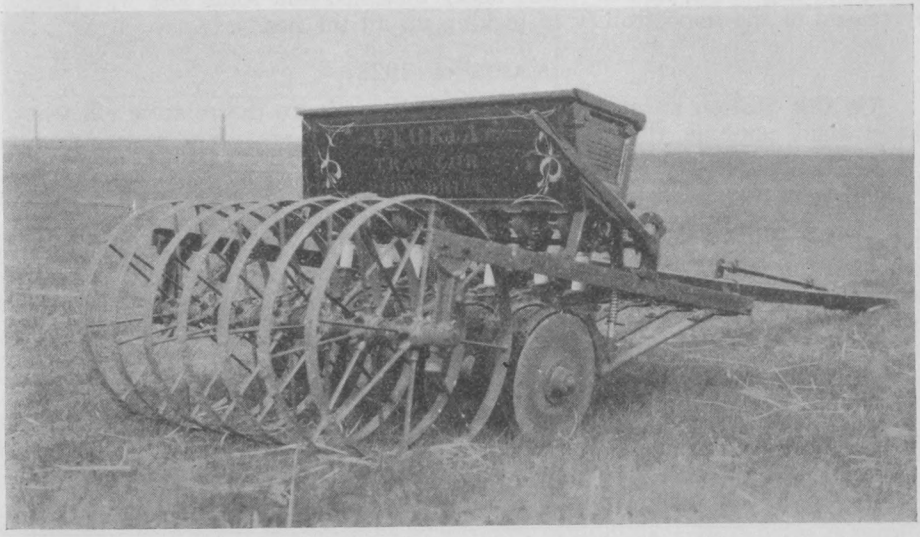
ridged condition that should be fairly effective in preventing soil drifting. The use of this attachment naturally increases the draft of the drill. A twenty-run drill equipped with sub-seeders is a fair load for six horses.

THE KIRCHNER SEEDER-PLOUGH.—This implement turns over a number of shallow six-inch furrows. The seed is broadcast in the furrows. In general there are six plough-bottoms making a total width of three feet. Like the Mitchell sub-seeder this implement, owing to the necessity of good cleaning of the plough-bottoms, works best in light soil. In fairly light soil that is reasonably free from stones it is an efficient means of seeding a stubble crop. The plough can be used as a summer-fallowing implement. Three successive ploughings at increasing depths will keep a summer-fallow fairly free of weeds. On light soil and on farms of small area the seeder-plough should be of considerable value, as it is capable of displacing the gang-plough, seed-drill and duck-foot cultivator. It is a fair load for six horses.

THE PEORIA PLOUGH-DRILL.—This is a small press-wheel seed-drill which is attached behind a gang-plough. The seed is placed in the freshly-turned soil. This implement could not be used in heavy land and it is very probable that difficulties would attend its use in a wet spring. In 1928 the area seeded by



The Kirchner seeder plough viewed in the direction of travel.



The Peoria tractor plough drill is drawn directly behind a gang plough.

the Peoria plough-drill had a more even germination than had any other area of spring ploughing. The moisture supply for the second-year crop was small and if any length of time elapsed between ploughing and seeding a vital portion of the soil moisture had evaporated. The plough-drill placed the seed in the soil at the time when the maximum of moisture was available. This drill was attached to a three-bottom tractor gang-plough. The total draft was equivalent to that of a four-bottom plough; that is, drill seeding a width of three feet and six inches means an added load equal to one fourteen-inch plough-bottom.

COMBINED HARVESTER-THRESHER

The most outstanding development in harvesting methods, apart from a vast increase in the number of combines used in 1928, was the introduction of the swather, or windrowing device, and the pickup. These implements are auxiliaries to the combine and are designed to increase its utility. Whether they did so or not is still a debatable question but certainly they were a pronounced factor in selling the combine. Many farmers, who refused to let their crops stand in the field until ready for straight combining, were attracted by the idea of the swather. They could commence operations just as early with the swather as with the binder, and apart from any financial benefit derived from its use it gave the farmer something to do at a season of the year when habit and custom demanded activity.

SEASON OF 1927

The harvest season of 1927 was particularly unfavourable. Considerable areas of stooked grain stood in the fields over winter. Some fields designed for the combine were not harvested until May, 1928. The grain harvested by the combine in May was bleached almost white, but was hard and dry. The stooked grain was not bleached to the same extent, but considerable loss was occasioned by mice wintering in the stook. In at least one case swaths lay on the ground over winter. These were picked up and threshed in May. The grain, although hard and dry, was badly bleached and some loss was sustained by reason of the impossibility of picking up all the heads.

SEASON OF 1928

On this Station an attempt was made to compare the relative efficiency of the straight combine, the swather and the header-barge. The last is a species of dump-cart which receives the headed grain from the header. The grain is dumped on the field in the form of small stacks having an approximate length of fourteen feet by six feet in width and six feet high. The grain was left in the stack until dry. The combine, with the knife and reel removed, was used to thresh the stacks. The header-barge and swather were operated at intervals beginning with the normal date of binder-harvesting and continuing until the grain was dry enough for straight combine harvesting. Moisture determinations were made of all grain harvested by the swather and header-barge at three-day intervals extending from the day of cutting until that of threshing.

OPERATION OF THE SWATHER

Ready for binder	Cut by swather	Threshed	Days in swath	Moisture when cut	Moisture when threshed	Commercial grade
				%	%	
Aug. 16	Aug. 16	Aug. 30	14	24·0	15·1	3
Aug. 29	Aug. 29	Sept. 7	9	23·0	14·3	3
Aug. 29	Sept. 1	Sept. 7	6	20·0	14·9	3
Aug. 29	Sept. 4	Sept. 17	13	17·0	13·6	3
Aug. 29	Sept. 7	Sept. 17	10	16·1	13·5	3

Operation of the Header-Barge

Ready for binder	Cut by swather	Threshed	Days in swath	Moisture when cut	Moisture when threshed	Commercial grade
				%	%	
Aug. 29	Aug. 29	Sept. 7	9	35·3	15·2	3
Aug. 29	Sept. 1	Sept. 17	16	26·2	14·3	3
Aug. 29	Sept. 4	Sept. 20	16	23·0	14·0	2
Aug. 29	Sept. 7	Sept. 20	13	16·0	13·2	2

In the case of the first cutting by the header the following shows the rate of decrease of the moisture content:—

On August 29 the moisture content was 35·3 per cent.
On September 1 the moisture content was 19·14 per cent.
On September 4 the moisture content was 17·38 per cent.
On September 7 the moisture content was 15·23 per cent.

In order to put the header-barge to a more severe test it was used on another field where the crop in addition to being very green, was badly infested by green pigweeds. The moisture content on the day of cutting was 48·34 per cent. Three weeks later the stacks were threshed and the moisture content of the grain was 14·41 per cent.

Operation of Straight Combine

Ready for binder	Cut by combine	Days	Moisture content when cut	Commercial grades
			%	
Aug. 16	Aug. 31	15	14·61	3
Aug. 29	Sept. 12	14	14·60	3
Aug. 29	Sept. 17	19	13·92	2
Aug. 29	Sept. 27	29	13·0	3

The most outstanding feature of the foregoing results is that the swathed grain, and particularly that which was swathed at the normal time of binder harvesting, did not dry out any earlier than did either the standing grain or grain in the stook. It does not appear from the foregoing figures that the use of the swather in this case advanced the date of threshing with the combine to any marked extent.

Owing to the peculiarities of the spring season, there was a great amount of uneven germination in all grain crops. This resulted in an excessive degree of uneven ripening. It was hoped that the use of the swather would overcome this disability. The green portions of the crops swathed did not dry out any earlier than those in the standing grain. Neither standing grain nor swathed grain suffered any marked damage during the waiting period as the weather was unusually fine and dry. The growth of straw was considerably heavier than that of a normal year, hence the amount of green weeds was so small as to constitute no serious impediment to straight combining. In general it may be said that the season was not such as to allow for a severe test of the merits of the swather except in regard to the matter of speeding up the operation of the combine by reason of an earlier start. Owing to the necessity of leaving the grain in the swath for upwards of two weeks, the greater portion of the initial advantage in time-saving was lost. In addition the extra cost of swath-

ing, amounting to as much as eighty cents per acre, and the inability of practically any make of combine to attain a speed of over two miles per hour when picking up the heavy swaths, has had a sobering effect on the majority of the operators of swathers.

In the district where Marquis wheat is the principal crop, the value of the swather is still in doubt. It may possibly be useful even in the Marquis wheat districts when used to a limited extent on weedy fields and where uneven ripening prevails. It is unlikely that it will be used so extensively by the individual farmer in succeeding years. Where oats, barley and fall rye are extensively grown as well as varieties of wheat more prone to shattering than Marquis, the swather or some such auxiliary to the combine is necessary if combines are to be used.

The straight combine harvesting a tangled crop of wheat. Yield 36 bushels per acre.

The header-barge showed up very well in the past season. Fields where ripening was particularly uneven and fields infested by green weeds were successfully harvested by the header-barge. The stacks dried out perfectly and the grain when threshed was of good colour and the grades obtained compare favourably with those obtained for binder-cut grain, straight-combined grain or swathed grain. There still remains the possibility of heavy rains of considerable duration wetting the stacks to the bottom. This happened at Arrowwood, Alberta, in 1927, where the October rainfall was very heavy. Those stacks had to be scattered on the ground. Apart from this possibility there seems to be nothing to prevent the use of the header-barge as an auxiliary to the combine, either in conjunction with the swather or in its place.

COST OF HARVESTING WITH THE HEADER-BARGE

The twelve-foot header maintained an average speed of 1·5 miles per hour when due allowance was made for the time required to dump the barge. One man and six horses were used on the header and two men and two horses on

the barge. The header harvested 2·18 acres per hour at an average cost for man and horse labour of seventy-one cents per acre.

As four horses were able to draw the combine from one stack to the next, the cost of threshing the stacks is somewhat less than the cost of either threshing swaths or straight combining. In a fifteen-bushel crop there was one stack per acre. The average time elapsing between the commencement of threshing on one stack and the commencement of the next was less than eight minutes. Therefore two men were able to thresh the stacks on seven and one-half acres in one hour. In a thirty-bushel crop only half that area could be threshed in one hour. Evidently the removal of the knife and reel gives the combine motor a considerable amount of surplus power for threshing purposes. At no time

The combine threshing header-barge stacks. Note the heaps of straw at the rear of the combine.

was the machine in danger of plugging although two men were engaged in throwing the headed grain on the combine table. When the combine is equipped with a straw spreader no trouble will be experienced by reason of the straw piling up at the rear end.

COMPARATIVE LOSSES OF WHEAT IN HARVESTING AND THRESHING

(Swather and Combine)

Grain lost behind swather knife	6·7	pounds per acre
Grain left in the swath by pickup	10·1	pounds per acre
Grain thrown over by combine	8·18	pounds per acre
Total loss	24·98	pounds per acre

Gross yield, 33·85 bushels per acre.
Per cent lost, 1·23.

(Straight Combine)

Grain lost behind knife	14·68	pounds per acre.
Grain thrown over by combine	9·3	pounds per acre.
Total loss	23·98	pounds per acre.

Gross yield, 34·2 bushels per acre.
Per cent loss, 1·16.

(Header-barge and Combine)

Grain left on ground by header	24·36 pounds per acre.
Grain lost at stack	3·11 pounds per acre.
Grain thrown over by combine	5·75 pounds per acre
Total loss	33·22 pounds per acre.

Gross yield 33·12 bushels per acre.
Per cent lost 1·67.

(Binder and Separator)

Grain lost behind binder knife	16·52 pounds per acre.
Grain lost in stooking and around stook	22·23 pounds per acre.
Grain lost below bundle carrier	17·61 pounds per acre.
Grain lost on bundle rack	5·69 pounds per acre.
Grain lost in separator	11·32 pounds per acre.
Total loss	73·37 pounds per acre.

Gross yield 34·18 bushels per acre.
Per cent loss 3·58.

THE SWATHER AND COMBINE IN OATS

A seven-acre field of oats was divided into two equal parts. One part was swathed on August 20 and threshed on August 31. The remainder was harvested with the straight combine on September 26. The entire crop was clean, uniform and stood up well. The moisture content of the swathed portion was 21·2 per cent when swathed and 8·8 per cent when threshed. The straight combined portion had a moisture content of 8·13 per cent when threshed. The swather and pickup left 12·36 pounds of grain per acre on the ground. The straight combine left 57·2 pounds. It should be noted that the greater portion of the swather loss was occasioned by one swath falling partly in a dead furrow in which the pickup was operated with difficulty. Over the remainder of the swathed portion of the field the loss was almost non-existent. This would indicate that oats sustain a much greater loss from shelling while waiting for the straight combine than does Marquis wheat. The same is equally true of barley and fall rye.

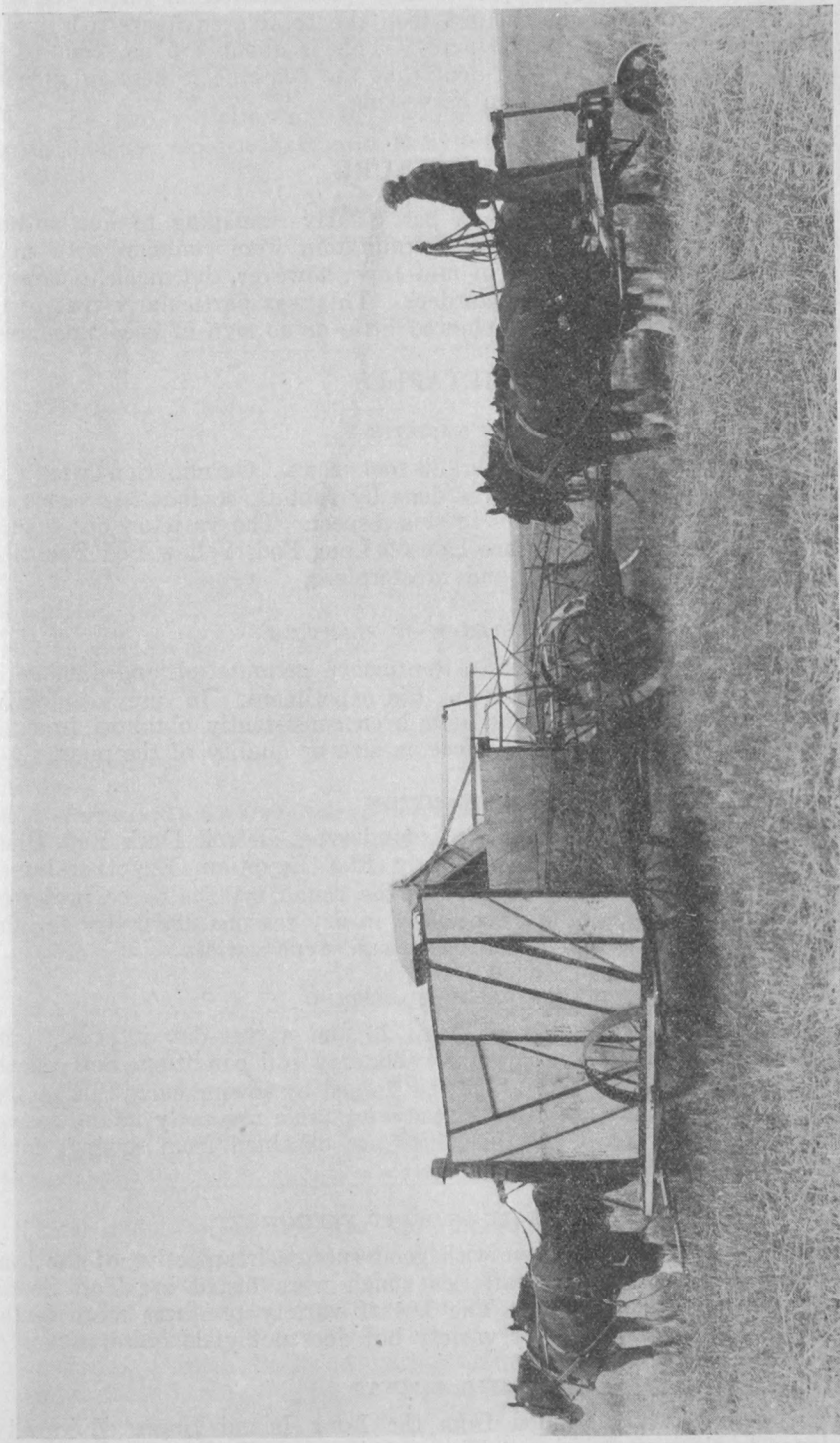
Questionnaires on the combine were sent to six hundred operators in the Prairie Provinces. Up to January 9th, 275 were returned. Of this number 43·6 per cent of the machines were used entirely as straight combines; 37·4 per cent were used partly as straight combines and partly with the swather and pickup. The remaining 19 per cent used the swather on the entire area harvested. The total area harvested by the 275 machines was 169,269 acres which is an average performance of 615·5 acres for each machine.

ACREAGE HARVESTED BY COMBINES

—	No.	Total acres	Average acres	Acres swathed	Acres straight combine	Acres wheat	Acres other crops
Straight combined	120	73,851	615·4	.....	73,851	67,853	5,998
Swathed and straight combined	103	61,471	596·8	29,740	31,731	49,569	11,902
Entire crop swathed	52	33,947	652·8	33,947	.....	28,517	5,330
Totals	275	169,269	615·5	63,687	105,582	145,939	23,230

In width of cut the combines ranged from eight feet to twenty feet. The following is an arrangement according to sizes:—

—	8 feet	10 feet	12 feet	15 feet	16 feet	20 feet
Straight combine only	8	20	5	57	27	3
Swather and straight combine	0	25	5	30	33	10
Swather and combine	0	13	8	10	15	6



The barge and header harvesting wheat.

Assuming that 615·5 acres is the average performance for all of the combines used in Western Canada in 1928 then the total area harvested by this means was approximately 2,700,000 acres. This is about 7·5 per cent of the total area in grain crops. It is evident that the combine is here in sufficient numbers to have a marked effect on harvesting.

HORTICULTURE

The prolonged spring drouth was particularly damaging to horticultural projects. Complete failure or uneven germination were common with many garden crops. The abundant rains of mid-June, however, did much to improve the appearance of the grounds and gardens. This was particularly true of the lawn grass, which prior to June 15 showed little or no sign of becoming green.

VEGETABLES

BEAN VARIETIES

Twenty varieties were grown in 30-foot rows. Germination was very irregular and considerable damage was done by rabbits, so that the yields did not reflect the merit of the varieties in this respect. The varieties outstanding in size, shape and general quality are Hodson Long Pod, Yellow Pod Bountiful, Interloper Challenge, The Prince, and Masterpiece.

BEANS—DISTANCE OF PLANTING

As with the variety test of beans, the uneven germination and damage by pests prevented obtaining good data for the experiment. In previous years, however, the highest yields of beans have been consistently obtained from the thickest plantings with no material effect on size or quality of the pods.

BEET VARIETIES

The following varieties were grown: round type, Detroit Dark Red, Black Red Ball, Market King; flat, Extra Early Flat Egyptian, Egyptian-James; half long, Improved Dark Red. Generally the round type is to be preferred, the long type tending to be rough, especially in dry seasons under dry farming conditions. Detroit Dark Red is the best round type variety.

BEETS—DATES OF SEEDING

Detroit Dark Red was sown on April 20 and at ten-day intervals until May 30, making a total of five sowings. The dry soil conditions delayed the first three sowings so that no advantage was gained by sowing early this season. Generally early-sown beets are always ready for table use early in the season. For winter storage, the most suitable beets are obtained from sowings made between May 10 and May 20.

BORECOLE OR KALE—VARIETY EXPERIMENT

This vegetable has been grown with good success irrespective of the kind of season prevailing. The two varieties which were tested are Tall Scotch Curled and Dwarf Green Curled. The Dwarf variety produces more tender foliage as compared with the taller variety but does not yield quite so well.

BRUSSELS SPROUTS

Unusual success was obtained from the Long Island Improved variety, which belongs to the novelty class. The next best was Dwarf Improved. No sprouts were obtained from Paris Market and Barr Little Gem.

CABBAGE

Cabbages are among the most successful vegetables grown on the Station, regardless of the season. The varieties Glory of Enkhuizen and Succession have persisted during the past four years in producing the largest average-size heads. The two varieties are of the medium-early type. Two very early varieties, namely, Golden Acre and Babyhead, are highly recommended for early use.

CABBAGE—VARIETY TEST

Variety	Average weight per head, 1928	Average four years
	lb.	lb.
Glory of Enkhuizen	11·15	10·98
Succession	8·09	9·94
Kildonan	6·31	8·89
Early Winnigstadt	9·94	*8·37
Brandon Market	5·77	8·13
Danish Ballhead (short stem)	11·54	8·08
Summer Ballhead	8·36	7·90
Danish Roundhead	5·59	7·49
Golden Acre	9·04	*7·18
Early Paris Market	10·58	*6·69
Babyhead	4·54	*6·51
Copenhagen Market	9·22	6·25
Northern Favourite	4·54	6·19
Improved American Savoy	3·81	6·15
Early Jersey Wakefield	9·68	4·59
Ex. Amager Danish Ballhead	5·18	4·58
Danish Ballhead	6·49	4·51

*Three-year average.

CABBAGE—DIFFERENT DATES OF SEEDING FOR WINTER STORAGE, SOWN AT INTERVALS OF TEN-DAY PERIODS

Variety	Ten days between each sowing	Yield per 30-foot row 1928	Average yield for four years	Remarks for 1928
		lb.	lb.	
Copenhagen Market	1st sowing	103	76	Many split.
Copenhagen Market	2nd sowing	71	75	None split.
Copenhagen Market	3rd sowing	29	66	None split.
Copenhagen Market	4th sowing	33	60	None split.
Copenhagen Market	5th sowing	None	21	None headed up.
Ex. Amager Danish Ballhead	1st sowing	68	40	Small firm heads.
Ex. Amager Danish Ballhead	2nd sowing	61	55	Small firm heads.
Ex. Amager Danish Ballhead	3rd sowing	None	36	None headed up.
Ex. Amager Danish Ballhead	4th sowing	None	18	None headed up.
Ex. Amager Danish Ballhead	5th sowing	None	8	None headed up.

The first date of seeding was April 24, followed by four seedings at intervals of ten days. The Copenhagen variety, being an early sort, was much more suitable for a season having a long, dry spring period such as prevailed this year, since the seed of this variety when sown as late as May 24 was still able to produce good cabbage for winter storage purposes. On the other hand, the later-maturing Danish Ballhead variety requires to be sown fairly early to produce suitable heads, but to get a good stand from seed sown early in dry soil would not be probable. One plant from seed of Copenhagen Market sown April 24 produced a head weighing 20 pounds, and a few others averaging approximately 15 pounds.

CARROTS—VARIETY TEST

Five varieties were planted, and of these, Guerande or Oxheart is recommended. The longer types are often inclined to become forked and rough under hard, dry soil conditions.

CARROTS—DATES OF SEEDING

Five sowings of the Chantenay variety were made at ten-day intervals, commencing on April 20. The seed of the first sowing did not germinate till May 4. The later sowings yielded as well as the earlier sowings, although in previous seasons, when moisture conditions were favourable, earlier seeding resulted in larger yields.

CAULIFLOWER—VARIETY TEST

Five varieties were sown in flat boxes in the greenhouse on March 28, were pricked out on April 4 and planted in the open May 23. The best heads were secured from the Early Snowball variety.

CELERY

Twelve varieties were sown in flats on March 21, were pricked out April 12 and planted in trenches 12 inches deep and 18 inches wide, the plants being arranged in double rows 6 inches apart and spaced 6 inches apart in the row. The season was too dry for celery, particularly in July, August and September. Water was applied during critical parts of the growing season. Better results would have been obtained if more water had been available. The varieties listed in the tables are among the best in the test.

CELERY—VARIETY TEST

Variety	Source of seed	Height of blanch	Average weight per head			
			1928		Four years	
		in.	lb.	oz.	lb.	oz.
Paris Golden Yellow	Steele Briggs	10	0	12	1	2
White Plume	Graham	13	0	8	0	13
Golden Self Blanching	Commercial	12	0	8	0	12

CELERY—CULTURAL EXPERIMENT

Six different methods of growing and blanching celery are used. Of these the best results have been obtained every year from planting in either single or double rows in trenches, and earth blanching. The plants grown in the trenches are usually larger and much better blanched. An additional advantage is gained in the protection from early fall frosts which is afforded by the trench method of planting.

CORN—TEST OF VARIETIES

Ten varieties were planted on May 11. The seedlings did not show above ground till May 21. June rains favoured the crop and good yields of cobs were obtained from the earliest sorts; namely, Sixty-day Golden, Alpha, Burbank, and Burleigh County Mixed.

LETTUCE—VARIETY TEST

Seventeen varieties were sown in the open on April 21. The first seedlings appeared on May 5. Germination was generally irregular due to lack of moisture. Many good heads were obtained, however, at various times during the season, depending upon when the seed germinated. Grand Rapids was the best among the loose leaf sorts, while Iceberg, Crystal Head, New York, and Wonderful did well among the "headed" kinds.

ONIONS—TEST OF VARIETIES

Twelve varieties were sown on April 23. The spring was much too dry, however, for this vegetable.

PARSNIP—DATES OF SEEDING

Seed of the Hollow Crown variety was sown every ten days dating from April 20 to May 30. The delayed germination of the earlier seedings resulted in about the same yields from all seedings. Experiments of the previous years have generally favoured early sowing.

PEA—VARIETY TEST

Seven varieties were planted, and of these the Pedigree Early variety was the earliest of the early sorts, though the pods were small. The English Wonder is an early pea to be recommended, whilst Stratagem is a good later variety.

PEA—DISTANCE OF PLANTING

Due to irregular germination, reliable data could not be obtained from this experiment. Previous experiments have indicated, however, that higher yields of peas are obtained when planting seed one inch apart, as compared with two- and three-inch spacings, though the thicker planting usually reduces the size and number of peas to the pod.

POTATOES—SPROUTED VS. NOT SPROUTED

Sets of Irish Cobbler were placed in flat boxes in the greenhouse under subdued light on March 20. The sets were planted in the open on May 24. Potatoes were ready for use on July 16, or about ten days earlier than from unsprouted sets. In past seasons, sprouting prior to planting has produced edible potatoes as much as 25 days earlier than the usual method of planting without permitting sprouts to form on the sets.

POTATO VARIETIES

Variety	Yield per acre 1928	Yield per acre 6-year average
	bush.	bush.
Epicure	351	362
Houghton Rose	359	333
Carter Favourite	319	316
Irish Cobbler	339	315
Wee MacGregor	323	314
Duchess of Norfolk	215	274
Early Ohio	327	248
Early Sunrise	391	
Gold Nugget	315	
Early Six Week	311	
Bovee	307	
Netted Gem	255	
Bliss Triumph	246	
King George V	207	

A large number of the varieties that were carried in the test in previous years have been replaced by new kinds. Epicure, which heads the list regarding yield, is a white-skinned potato, resembling the Irish Cobbler in some respects but of more flattened shape and shallower eyes. Among the newly-tested varieties, the Early Sunrise gives much promise with respect to yield, earliness of maturing, shape, and freedom from scab. As a rule, early-maturing potatoes are less affected by scab than the later sorts.

RADISH—VARIETY TEST

Eight varieties were planted on April 23, and seedlings showed above ground from one week to ten days later. The following is a summary regarding the quality of the varieties tested this year:—

Variety	Remarks
Twenty-day Forcing	Strong flavoured.
Saxa	Mild, good shape.
French Breakfast	Rather coarse.
Icicle	White, mild flavour.
Scarlet Turnip White Tipped	Mild, fair shape.
XXX Scarlet Oval	Mild.
Scarlet Turnip or Sparkler	Mild, rather coarse.
Chartier	Mild, good shape.

SQUASH—PUMPKIN—VARIETY TEST

Seven varieties of squash and five varieties of pumpkin were planted in hills on May 16. Germination was only fair. The plants made fair progress till August 23, when they were frozen. By this time the Golden Hubbard of the squash varieties was the only kind nearing maturity, while the Small Sugar and Sugar varieties were farthest advanced among the pumpkins.

TOMATOES

Thirty-nine varieties or strains were sown in flats on March 20 and were pricked out into paper pots April 9. They were planted out in the open on May 26. The varieties made good progress until the occurrence of frost on August 23, which decreased considerably the yield of ripe fruit from the early-maturing kinds. Among the earliest and most promising varieties are the following: Sparks Earliana, Chalk Early Jewel, A x BB, O-11389, Alacrity, O-11381, and LG x BB, O-11392.

FRUITS AND ORNAMENTALS

ORNAMENTAL SHRUBS

Variety	Winter killing	Began to bloom	Bloom over
Ginnalian Maple	Nil	.....	.....
Siberian Pea Tree	Nil	.....	.....
Woody Caragana	Nil	May 30...	June 28
Dwarf Caragana	Nil	" 30...	" 28
Common Lilac	Nil	" 10...	" 4
Josikea Lilac	Nil	" 12...	" 6
Villosa Lilac	Nil	" 26...	" 28
Halimodendron	Nil	June 18...	July 8
Van Houtte Spiraea	Slight	May 9...	June 25
Sorbus-leaved Spiraea	Slight	" 11...	July 27
Spiraea arguta	Slight	" 17...	May 29
Spiraea billardi	Slight	July 8...	Aug. 16
Tartarian Honeysuckle	Nil	May 19...	June 4
Albert Regel Honeysuckle	Nil	" 10...	" 4
Japanese Rose	Slight	April 8...	Aug. 12
Rosa rubrifolia	Considerable	" 6...	June 13
Russian Olive	Nil	.....	.....
Shrubby Cinquefoil	Nil	May 20	Aug. 12
Missouri Currant	Nil	" 15...	June 2
Siberian Dogwood	Nil	" 20...	" 18

TREE FRUITS

One hundred and fourteen apple and plum trees were winter killed, and sixty-eight proved hardy. The winter was unusually severe, so that any tree that was tender was eliminated by natural means. Some very promising hardy trees remain, many of which will probably bear fruit next season should they winter over successfully.

BUSH FRUITS

Some excellent yields were obtained from black currant bushes planted in 1926. The outstanding varieties in the order of merit being Collins Prolific, Black Grape, and Magnus. The best red variety was Greenfield, and the best white variety was White Grape.

Raspberry bushes planted in 1926 have suffered considerable winter killing during the past two winters. Newman No. 23 has showed considerable winter hardiness and consequently produced the highest yields this season.

Gooseberry bushes were planted in 1926. No winter killing has occurred, and the bushes are now of good size and in good condition. The yield of fruit was small this year.

PERENNIAL FLOWERS

Part of the perennial border was not given winter protection, and notes taken on the unprotected plants in the spring showed that much winter killing took place as compared with the mulched plants. Among the unprotected varieties, *Gypsophila, Delphinium, Anchusa italica, Linum sibiricum,* Sweet William, and Pansy showed greatest resistance to winter killing. It is considered worthwhile practice, however, to mulch perennials every fall after the first severe frost with either strawy manure, clean wheat straw, or old hay. The following collection is recommended: Pyrethrum, *Gaillardia, Linum sibiricum, Achillea,* Pansy, Sweet William, *Delphinium, Aquilegia, Gypsophila,* and Lychnis.

TULIPS—VARIETY TEST

Due to the long dry spring season, tulips did not make as good a showing as in any of the previous five years. Bulbs planted in exposed areas in the fall of 1927 did not do so well as bulbs planted two years previously in a bed protected by large shrubs. All the tulips were protected during the winter with a six-inch mulch of rotted manure or one foot of short straw.

ANNUAL FLOWERS

Nearly sixty varieties were planted about the grounds. Approximately two-thirds of the varieties were started in flats in the greenhouse on March 29; the remainder were sown in the open May 7. Those sown in the open were slow to germinate, due to dry soil conditions. Some did not germinate at all. Timely June rains encouraged growth and a good showing of bloom lasted till the frost of August 23. Among the best of the season were Stocks, Chrysanthemums, Asters, *Helichrysum, Petunia, Portulaca,* and *Alyssum.*

SWEET PEAS

Over sixty varieties were planted in hills previously prepared by excavating one foot deep and filling in with six inches of rotted manure in the bottom and six inches of surface soil at the top. Germination of seed, however, was slow, which again is attributed to dry weather, and since the plants did not get a good early start a plentiful supply of blooms was not obtained as in previous years.

INSECT PESTS

A number of insect pests were observed during the season, and measures were taken to keep them under control as follows:—

Yellow Spotted Slug *(Pteronus ventralis)* attacking Laurel and cutleaf willows; checked by several applications of arsenate of lime by spraying.

Poplar Leaf Beetle *(Lina scripta)* attacking Russian Poplar—damage only to extent of rolling edges of leaves, otherwise harmless.

Caragana Blister Bettle *(Lyatta nutalli)* attacking caragana, Halimodendron and beans; controlled by spraying arsenate of lime.

American Elm Aphis *(Schizoneura americana)* attacking American elm—percentage of infestation small; checked by picking and destroying leaves.

Leaf Folding Sawfly *(Potania bozemani)* attacking Russian Poplars; controlled by spraying with arsenate of lime and burning leaves in the fall of the year.

CEREALS

The work with cereals has been extended this year, particularly with respect to the number and replication of rod-row plots. Many new selections and varieties of wheat, oats, barley, rye, peas and flax are now under test and observation. In order to determine more accurately the local adaptability of wheat varieties, eight different sorts were sent to thirty farmers in various parts of southwestern Saskatchewan in the spring of 1928. These were planted by the co-operating farmers, according to directions issued by the Station. At harvest time, the plots were harvested, put in bags and shipped to the Station, where yields and other data were obtained. This method is proving very useful in confirming or limiting conclusions reached as a result of variety testing at the Station.

COMMON SPRING WHEAT—TEST OF VARIETIES AND STRAINS, 1928

1/50-acre plots—triplicated. Sown on fallow, April 27.

Accession number	Variety	Date ripe	Height at harvest	Yield per acre	Weight per measured bushel at separator
			in.	bush.	lb.
39	Red Bobs Supreme	Aug. 23	42	48·6	63·0
126	Ceres	" 23	44	46·9	63·0
31	Garnet Ott. 652	" 13	37	*45·7	62·6
37	Kitchener	" 27	47	44·8	60·2
101	Early Red Fife Ott. 16	" 27	45	44·8	62·3
103	Marquis Ott. 15	" 22	44	42·0	62·8
33	Producer Ott. 197	" 18	43	41·7	61·3
125	Reliance	" 24	45	41·6	62·7
132	Red Fife Ott. 17	" 28	46	39·8	62·0
82	Reward Ott. 928	" 17	38	34·6	65·3
128	Renfrew	" 25	48	34·2	61·7
28	Ruby Ott. 623	" 13	41	33·1	64·5

*Average yield of duplicates.

DURUM WHEAT—TEST OF VARIETIES AND STRAINS, 1928

1/50-acre plots—triplicated. Sown on fallow, April 27.

Accession number	Variety	Date ripe	Height at harvest	Yield per acre	Weight per measured bushel at separator
			in.	bush.	lb.
133	Mindum	Aug. 25...	56	47·1	65·2
24	Kubanka	" 25...	56	41·5	63·3

SPRING WHEAT—VARIETIES AND STRAINS

Comparative Yields for a Number of Years

Variety	Yield of grain, bushels per acre							Average for years grown	Average for Marquis for same years	Comparative yields in per cent of Marquis for same years
	1922	1923	1924	1925	1926	1927	1928			
Ceres	.....	.....	.....	.....	.....	43·5	46·9	45·2	40·6	111·1
Mindum	.....	.....	.....	.....	.....	39·1	47·1	43·1	40·6	106·1
Garnett Ott. 652	.....	.....	.....	26·5	31·1	39·1	45·7	35·6	33·9	104·9
Supreme	32·0	26·0	18·2	26·8	32·6	39·7	48·6	32·0	30·5	104·8
Kitchener	38·0	22·6	19·9	28·0	33·0	37·4	44·8	32·0	30·5	104·7
Reliance	.....	.....	.....	.....	.....	43·1	41·7	42·4	40·7	104·3
Producer Ott. 197	.....	.....	.....	26·4	37·5	32·1	41·7	34·5	33·9	101·6
Kubanka Ott. 37	37·3	26·0	19·8	24·5	33·2	34·1	41·5	30·9	30·5	101·3
Marquis Ott. 15	32·0	27·5	18·6	23·3	31·0	39·3	42·0	30·5	30·5	100·0
Early Red Fife Ott. 16	30·7	22·3	18·6	27·2	28·5	32·2	44·8	29·2	30·5	95·5
Red Fife Ott. 17	28·4	22·2	21·2	.....	.....	36·8	39·9	29·7	31·9	93·1
Ruby Ott. 623	31·3	35·7	19·5	23·6	29·8	29·3	33·1	27·5	30·5	89·9
Renfrew	.....	.....	.....	.....	.....	38·2	34·2	36·2	40·7	89·1
Reward Ott. 928	.....	.....	.....	22·0	29·5	34·4	34·6	30·2	33·9	88·9

Ceres, a bearded variety, the product of a cross between Marquis and Kota made at the Experiment Station at Fargo, North Dakota, has been under test here for only two years. The yield has been good, but on account of weakness of straw and rather poorer quality than Marquis, it is probably not a desirable wheat in this district. It has the virtue of being fairly rust-resistant.

Reward wheat continues to excel in quality, but the yield is relatively low. Garnet is slightly earlier than Reward and considerably higher in yield. Neither of these early wheats seems destined to replace Marquis in Southwestern Saskatchewan except under peculiar local conditions where earliness is especially desirable.

Mindum and Kubanka, both durum wheats, do not show sufficient superiority in yield to justify a farmer in growing them in preference to Marquis.

WINTER WHEAT

Twenty varieties of winter wheat were planted in both rod row and 1/50-acre plots in the autumn of 1927, but by the spring of 1928 all were practically 100 per cent killed. This killing was attributed to the long, open period in January and February, when the ground was bare and freezing and thawing took place many times.

OATS—TEST OF VARIETIES AND STRAINS
1/50-acre plots—triplicated. Grown on fall-ploughed oat stubble

Accession number	Variety	Date ripe	Height at harvest	Yield of grain per acre	Weight per measured bushel at separator
			in.	bush.	lb.
61	Victory	Aug. 7...	35	57·8	41·3
79	Banner Ott. 49	" 7...	34	54·3	38·9
15	Longfellow Ott. 478	" 7...	34	53·6	40·3
19	Leader	" 7...	34	53·4	37·5
3	Gerlach	" 9...	34	53·0	38·3
62	Gold Rain	" 7...	35	52·5	43·6
60	Alaska	" 6...	34	51·4	39·0
2	Cole	" 4...	34	51·2	37·3
18	Abundance	" 8...	35	48·5	41·0
63	Daubeney Ott. 47	" 5...	33	47·3	37·3
80	Markton	" 7...	35	46·7	41·3
13	O.A.C. No. 72	" 9...	37	38·3	37·3
14	*Laurel Ott. 474	" 8...	34	34·3	49·1

*Hulless.

OATS—TEST OF VARIETIES AND STRAINS
1/50-acre plots—triplicated. Sown on fallow, May 12.

Accession number	Variety	Date ripe	Height at harvest	Yield grain per acre	Weight per measured bushel at separator
			in.	bush.	lb.
91	Gopher	Aug. 9...	41	89·4	39·6
3	Gerlach	" 17...	47	80·2	41·1
15	Longfellow Ott. 478	" 14...	47	79·6	39·6
62	Gold Rain	" 15...	49	75·1	42·6
2	Cole	" 6...	41	72·1	37·6
79	Banner Ott. 49	" 15...	47	71·6	38·6
61	Victory	" 15...	49	70·8	39·6
63	Daubeney Ott. 47	" 6...	41	69·3	38·1
18	Abundance	" 17...	49	68·7	35·6
60	Alaska	" 9...	40	67·1	37·1
14	*Laurel Ott. 474	" 13...	43	65·4	49·0
13	O.A.C. No. 72	" 18...	48	61·4	37·6
19	Leader	" 15...	47	59·8	34·6
80	Markton	" 17...	44	52·8	40·3

*Hulless.

OATS—TEST OF VARIETIES AND STRAINS
Comparative yields for a number of years—grown on fall-ploughed oat stubble

Variety	Yield of grain, bushels per acre						Comparative yield in per cent of Banner for same years
	1925	1926	1927	1928	Average for years grown	Average for Banner for same years	
Banner, Ott. 49	52·2	13·7	82·6	54·3	50·0	50·0	100·0
Victory	51·4	15·4	73·9	59·8	50·0	50·0	100·0
Cole	46·3	27·9	72·5	51·2	49·4	50·0	99·8
Leader	47·4	13·5	79·9	53·4	48·0	50·0	96·0
Gold Rain	39·2	8·6	86·0	52·5	46·5	50·0	93·0
Longfellow, Ott. 478	36·3	16·7	79·1	53·6	46·4	50·0	92·8
Daubeney, Ott. 47	43·3	22·8	71·0	47·3	46·1	50·0	92·2
Markton	.....	.....	78·2	46·7	62·4	68·4	91·2
Gerlach	38·7	10·0	78·9	53·0	45·1	50·0	90·2
O.A.C. No. 72	38·9	12·2	77·4	38·3	41·7	50·0	83·4
Abundance	41·5	9·6	63·5	48·5	40·7	50·0	80·4
Alaska	14·0	15·2	52·9	51·4	33·3	50·0	66·6
*Laurel, Ott. 474	31·2	7·6	59·5	34·3	33·1	50·0	66·2
*Liberty, Ott. 480	25·9	18·6	49·3	.....	31·2	49·5	63·1

*Hulless

OATS—TEST OF VARIETIES AND STRAINS

Comparative yields for a number of years—grown on fallow

Variety	Yield of grain, bushels per acre									Comparative yield in per cent of Banner for same years
	1922	1923	1924	1925	1926	1927	1928	Average for years grown	Average for Banner for same years	
Gopher	.....	.....	.....	.....	.....	.....	89·4	89·4	71·5	125·0
Gerlach	.....	68·5	51·8	61·7	53·4	91·6	80·2	68·2	61·9	110·1
Victory	.....	55·0	59·5	56·5	44·6	99·7	70·8	64·3	61·9	103·8
Gold Rain	70·6	53·5	52·3	63·4	51·4	86·9	75·1	64·7	63·7	101·5
Banner, Ott. 49	74·8	60·3	33·8	65·2	51·6	89·2	71·5	63·7	63·7	100·0
Longfellow, Ott. 478	.....	.....	32·2	52·1	55·4	85·5	79·8	61·0	62·2	98·0
O.A.C. No. 72	71·6	58·8	43·3	58·6	50·2	88·2	61·4	61·6	63·7	96·7
Leader	63·5	63·9	.....	63·0	50·9	94·1	59·8	65·8	68·7	95·7
Cole	.....	.....	45·0	44·4	35·9	98·2	72·1	59·1	62·2	95·0
Abundance	.....	44·3	42·7	55·9	59·4	74·9	68·7	57·6	61·9	93·0
Daubeney, Ott. 47	68·0	50·4	42·2	48·0	37·0	80·1	69·3	56·4	63·7	88·5
Alaska	55·1	47·1	39·3	41·5	.....	67·1	67·1	52·8	65·8	80·2
*Laurel, Ott. 474	.....	.....	.....	36·7	47·0	71·5	65·4	55·1	69·3	79·5
Markton	.....	.....	.....	.....	.....	73·0	52·8	62·9	80·3	78·3
*Liberty, Ott. 480	48·0	42·5	.....	19·6	33·3	49·9	.....	38·7	68·2	56·7

*Hulless.

Gopher is an early oat which originated at the Minnesota Experiment Station. It was grown at this Station for the first time this year from seed supplied by the University of Saskatchewan. Gerlach oats continue to yield well. Apart from the doubt as to the identity of this variety, it seems a desirable sort for Southwestern Saskatchewan. Further co-operative tests of its yield and general adaptability will be made in various districts next year.

Some differences will be noted in the standing of the varieties on fallow and on stubble. On the stubble land, Victory and Banner stand at the top for the four-year average, while on fallow Gerlach has yielded ten per cent more than Banner, and Victory has exceeded Banner by 3·8 per cent. Gold Rain, Longfellow, and O.A.C. No. 72 have also shown good yields on fallow. However, in view of the fact that most of the oats in Saskatchewan are grown on stubble land, the yields of the varieties on stubble are more significant to the farmer.

BARLEY—TEST OF VARIETIES AND STRAINS

1/50-acre plots—triplicated—Sown May 1 on fall-ploughed barley stubble.

Accession number	Variety	Date ripe	Height at harvest	Yield of grain per acre	Weight per measured bushel at separator
			in.	bush.	lb.
66	Gold	Aug. 11	33	46·5	52·8
9	Chinese, Ctt. 60	" 6	41	44·9	46·3
22	Charlottetown 80	" 10	32	43·7	51·5
8	Albert, Ott. 54	" 4	44	43·4	48·3
15	Hannchen	" 9	35	43·3	50·6
16	O.A.C. No. 21	" 6	37	42·5	48·0
21	Bearer, Ott. 475	" 9	39	42·1	44·8
14	O.A.C. 21, Sask. No. 228	" 6	45	36·5	45·5
17	Bark's	" 10	33	35·2	41·1
74	Junior, Ott. 471	" 3	35	35·0	60·8
10	Duckbill, Ott. 57	" 10	37	31·8	51·0

BARLEY—TEST OF VARIETIES AND STRAINS

1/50-acre plots—triplicated—Sown on fallow, May 1

Accession number	Variety	Date ripe	Height at harvest	Yield of grain per acre	Weight per measured bushel at separator
			in.	bush.	lb.
14	O.A.C. 21—Sask. 228	Aug. 14	53	52·8	51·3
16	O.A.C. No. 21	" 14	52	51·7	49·6
23	Trebi	" 17	44	51·4	44·0
66	Gold	" 19	39	45·9	52·5
74	Junior, Ott. 471	" 11	45	44·2	63·6
10	Duckbill, Ott. 57	" 13	43	43·1	52·3
8	Albert, Ott. 54	" 11	48	43·1	52·6
9	Chinese, Ott. 60	" 16	50	38·8	50·3
17	Bark's	" 22	41	39·5	44·6
15	Hannchen	" 12	35	38·6	52·5
21	Bearer, Ott. 475	" 19	46	35·7	45·6
22	Charlottetown No. 80	" 19	43	35·2	52·8
19	Feeder, Ott. 561	" 10	51	33·9	50·3

BARLEY—TEST OF VARIETIES AND STRAINS

Comparative yields for a number of years. Grown on ploughed barley stubble.

Variety	Yield of grain, bushels per acre							Comparative yield in per cent of O.A.C. No. 21 for same years
	1924	1925	1926	1927	1928	Average for years grown	Average for O.A.C. No. 21 for same years	
Trebi	33·4	20·9	22·4	48·4	.....	31·3	28·8	108·7
Hannchen	23·8	33·8	14·6	46·2	43·3	32·3	31·5	102·5
O. A. C. No. 21	32·3	16·6	12·3	54·0	42·5	31·5	31·5	100·0
Charlottetown 80	31·6	21·8	7·5	48·1	43·7	30·5	31·5	96·8
Bearer, Ott. 475	21·5	21·3	10·2	43·4	42·1	29·7	31·5	94·3
Albert, Ott. 54	15·0	20·0	18·0	49·3	43·4	29·1	31·5	92.4
O.A.C. No. 21—Sask. No. 228	23·4	14·6	14·0	55·7	36·5	28·8	31·5	91·4
Gold	.....	.....	6·9	46·2	46·5	33·2	36·3	91·4
Feeder, Ott. 561	17·1	16·6	10·6	52·9	33·9	26·2	31·5	83·1
Junior, Ott. 471	20·8	18·0	8·8	42·9	35·1	25·1	31·5	79·7
Chinese, Ott. 60	22·6	13·5	9·7	52·4	44·8	24·6	31·5	78·1
Duckbill, Ott. 57	17·4	18·7	4·5	46·5	31·8	23·7	31·5	75·2
Guymayle	22·2	17·8	9·2	46·5	.....	21·4	28·8	74·3
Bark's	15·1	18·0	4·8	34·7	35·2	21·5	31·5	68·2

BARLEY—TEST OF VARIETIES AND STRAINS

Comparative yields for a number of years. Grown on fallow.

Variety	Yields of grain, bushels per acre								Comparative yields in per cent of O.A.C. 21 for same years
	1922	1924	1925	1926	1927	1928	Average for years grown	Average for O.A.C. 21 for same years	
Trebi	63·3	33·4	36·9	45·7	57·1	51·4	47·9	44·3	108·1
Hannchen	62·5	23·7	44·5	46·8	69·6	38·6	47·6	44·3	107·4
Gold	.....	.....	.....	34·2	77·4	45·3	52·3	50·1	104·3
O.A.C. 21	48·7	32·3	34·3	34·1	64·6	51·7	44·3	44·3	100·0
Charlottetown 80	.....	31·6	39·3	33·7	68·9	35·2	41·7	43·4	96·0
O.A.C. 21, Sask. 228	.....	23·4	31·0	37·8	61·8	52·7	41·3	43·4	95·1
Beaver, Ott. 475	.....	21·5	39·6	29·5	75·7	35·7	40·4	43·4	93·0
Duckbill, Ott. 57	56·7	17·4	38·2	26·0	64·6	43·1	41·0	44·3	92·5
Chinese, Ott. 60	48·3	22·6	32·5	29·8	66·8	39·8	39·9	44·3	90·0
Bark's	61·7	15·1	33·8	19·4	73·4	39·5	39·5	44·3	89·1
Junior, Ott. 471	.....	20·8	34·8	32·1	51·0	44·2	36·6	43·4	84·3
Albert, Ott. 54	31·2	15·0	26·1	40·1	57·4	43·1	35·5	44·3	80·1
Feeder, Ott. 561	.....	17·1	17·5	26·6	57·4	33·9	30·5	43·4	70·2

Trebi, a six-rowed variety, has outyielded O.A.C. No. 21 by about eight per cent during the years it has been grown here. Hannchen (two-rowed) has almost equalled Trebi on fallowed land, but has produced somewhat less on stubble. Hannchen is rather weak in the straw, otherwise it is a very desirable barley.

Feeder barley is a six-rowed, early-maturing, hooded variety. It shatters badly when nearly ripe, hence it is undesirable as a grain crop. It may be used as an annual hay crop, particularly where it is desired to remove an early crop to destroy wild oats.

FALL RYE—TEST OF VARIETIES AND STRAINS

1/50-acre lots—Grown on fallow

Accession number	Variety	Yield of grain, bushels per acre					
		1924	1925	1926	1927	1928	Average for years grown
8	Rosen, Sask. 299	41·3	26·7	44·9	62·6	11·2	37·3
6	Advance, Sask. 668	42·9	25·8	41·8	60·9	13·6	37·0
9	Dakold 959	46·6	21·5	43·1	58·8	13·8	36·7
7	Dakold, Sask. 295	43·9	23·7	45·9	59·1	9·4	36·4
10	Common	.....	25·6	47·7	58·4	13·4	36·2
1	Swedish, Sask. 669	44·1	21·1	38·8	56·7	11·2	34·3

Fall rye yields were unusually light, which was mostly due to the prolonged spring drouth. Rosen and Advance are highest in yield but with only a very narrow margin over Dakold No. 959, which variety is much more winter-hardy than the first two mentioned and is the variety recommended for Southern Saskatchewan.

FLAX—TEST OF VARIETIES AND STRAINS

Comparative yields for a number of years

Accession number	Variety	Yield of grain, bushels per acre						
		1923	1924	1925	1926	1927	1928	Average for years grown
6	Linota	.....	.....	.....	.....	.....	16·7	16·7
1	Premost	16·5	14·3	12·7	14·5	8·9	15·8	15·4
4	Common	19·3	15·4	14·5	15·0	13·9	14·0	15·3
2	Novelty	16·5	16·7	14·0	14·9	8·3	16·7	14·5
3	Crown	14·8	16·8	12·4	13·7	10·9	12·7	13·5

Linota flax was grown here for the first time this year from seed supplied by the University of Saskatchewan. The variety originated at the University of Minnesota.

Premost is a reselection made by the Cereal Division, Central Experimental Farm at Ottawa, from seed obtained from the University of Minnesota.

No flax wilt has been observed in any of the varieties.

FIELD PEAS—TEST OF VARIETIES AND STRAINS

Comparative yields for a number of years

Variety	Yields in bushels per acre								Comparative yields in per cent of Can. Field for same years
	1923	1924	1925	1926	1927	1928	Average for years grown	Average for Can. Field Peas for same years	
Mackay	32·9	.....	.....	26·4	39·0	34·6	33·2	26·5	125·2
Carleton	28·3	44·4	31·4	25·3	39·8	32·9	34·0	27·8	122·2
Arthur	.....	41·9	25·1	28·0	26·7	38·9	32·1	30·0	107·0
Golden Vine Sask	18·5	42·2	26·2	19·6	34·1	34·6	29·2	27·8	105·0
Canadian Field	17·0	36·7	24·5	20·4	32·6	36·0	27·8	27·8	100·0
Golden Vine	13·0	31·4	29·1	25·8	36·2	27·9	27·2	27·8	97·8
Chancellor	19·2	.....	26·2	17·9	31·5	19·4	22·8	30·0	76·0

The Mackay peas, though somewhat later in maturing, have outyielded other varieties. The Mackay variety is the result of a cross between Mummy and Black Eyed Marrowfat, made at the Central Experimental Farm, Ottawa. Carleton is also a very good yielding variety and slightly earlier than Mackay. Golden Vine is a small white variety. The small size of the seed makes it possible to put this variety through the drill or threshing machine without cracking the seed.

FORAGE CROPS

While the season of 1928 was very favourable to obtaining catches of the newly-seeded biennial and perennial hay crops, the 1928 yields from seedings made in earlier years were generally unsatisfactory. Particularly in the perennial crops and also those biennials which had been seeded with cereal crops in the preceding year, the dry spring produced a stunted, prematurely-headed growth which failed to revive when rains came in mid-June. Both grasses and clover which had been seeded without nurse crops on fallow, in 1927, survived the spring drouth and made fairly satisfactory crops. This was doubtless due to the reserve of soil moisture carried over from the previous year. As indicated in this division of the report, there are very few grasses now available which show even a reasonable degree of adaptation to conditions in Southwestern Saskatchewan. With the hope of increasing the number of available adapted grasses, a considerable collection of the seeds of native species has been made. These are now being multiplied with a view to making selections and testing the yielding capacities and general usefulness of as many species and strains as possible.

CORN—TEST OF VARIETIES AND STRAINS FOR PRODUCTION OF GRAIN

Twenty varieties including many early sorts and acclimatized strains were planted in quadruplicated plots on May 7. Many varieties and strains which promised fair yields of ripe cobs were damaged by the August 22 frost. A strain of Gehu which has been subjected to selection and reselection at this Station during the past five years produced the highest yield of ripe cobs, which, however, was only a little more than 400 pounds per acre.

CORN—TEST OF VARIETIES FOR FODDER PRODUCTION

Variety	Source	Height at harvest	Yield per acre	
			Green weight	Dry weight
		in.	lb.	lb.
Improved Squaw	Exp. Stn. Swift Current	52	13,772	2,433
Falconer	O. Will	59	12,852	2,315
Quebec No. 28	Macdonald College	54	11,662	2,196
Northwestern Dent	O. Will	57	10,672	1,934
Minnesota No. 13	O. Will	57	9,658	1,876
North Dakota White Flint	O. Will	51	10,758	1,863
Gehu	Dakota Imp. Seed Co	47	10,192	1,840
Manitoba Amber Flint	Man. Agr. College	54	8,480	1,792
Assiniboine Yellow	O. Will	50	10,831	1,782
Northern Prolific	Rennie	55	10,429	1,772
Minn. No. 13 x Howes Alta. Flint	C.E.F	52	8,889	1,692
Twitchell's Pride	Exp. Stn. Fredericton	53	11,304	1,577
Minnesota No. 13—Haney	Northrupp King	60	7,886	1,540
Northwestern Dent	Exp. Farm, Brandon	53	8,140	1,317
Minn. No. 13 x Howes Flint	Northrupp King	60	7,689	1,306
Northwestern Dent—Crookston	Northrupp King	65	8,447	1,273
Manalta	Man. Agr. College	50	6,636	1,221
Hybrid No. 47	C.E.F	57	7,484	1,220
Northwestern Dent	Lethbridge	54	8,264	1,083
Minn. No. 13 Double Cross	C.E.F	52	7,111	1,090
Pioneer	O. Will	54	6,695	1,076
Minnesota No. 23	P. C. Colquhoun	59	6,040	1,043
Minn. No. 13 Double Cross	Northrupp King	55	6,209	1,011

Twenty-three varieties were planted in hills in quadruplicate plots on May 5. Seedlings showed above the ground twenty days later. All varieties were severely damaged by frost and were harvested during the next two days.

On the whole, the season was extremely unfavourable for corn. The delay in germination, the cool growing season and the early frost constituted a combination of factors which made the corn crop very poor. It is worth noting that under these conditions the very earliest varieties produced the highest yields in both green and dry weight.

SUNFLOWERS—TEST OF VARIETIES OR STRAINS

Variety	1928 Crop			Average for six years	
	Height at harvest	Green weight	Dry weight	Green weight	Dry weight
	in.	tons	tons	tons	tons
Ottawa 76	61	18·81	2·59	13·33	2·88
Mammoth Russian	66	16·94	2·50	14·37	2·49
Russian Giant	66	16·93	2·51	13·56	2·32
Manchurian	55	14·52	2·13	12·58	2·08
Black—C.P.R.	52	18·15	2·67	12·51	2·03
Mennonite	49	12·13	1·81	10·57	1·83
Manteca—C.P.R.	46	16·78	2·41	12·04	1·81
Mixed—C.P.R.	51	19·74	2·91	11·92	1·77

Owing to wireworm damage, many hills failed to produce plants. The yields were therefore calculated from the normal hills that remained. Frost occurred on August 22, when the earlier varieties were in bloom. Generally, the tall, late-growing varieties produce the highest yields. The earlier, shorter-growing varieties are more easily handled and can often be cut for silage before the grain harvest season begins.

Sunflowers have produced a somewhat higher average yield, both green weight and dry weight, than corn. Although making less desirable ensilage, the sunflowers, being more dependable and higher in yield, should make up at least half of the area devoted to ensilage crops. If the crop is being grown merely as a fallow substitute, with yield of fodder and certainty of supply of secondary importance, then corn should be used.

ANNUAL FODDER CROPS

1/50-acre plots—triplicated. Sown on fallow.

Crop	Height	Stand	Stage cut	Yield per acre
	in.			tons
Banner oats	44	Thick	Soft dough	2·83
Feeder barley	48	Thick	Full bloom	2·65
Oats (late)	38	Thick	Soft dough	2·63
Feeder barley and peas	45	Thick	Green pod	2·33
Banner oats and peas	46	Thick	Oats in milk	2·27
Siberian millet	32	Thick	Full blossom	2·18
Spring rye and peas	48	Normal	Green pea	2·02
Hungarian millet	33	Thick	Full blossom	1·93
Golden Vine peas	36	Normal	Green pea	1·85
Mackay peas	38	Normal	Green pea	1·73
Spring rye	49	Normal	Full bloom	1·56
Common millet	24	Normal	Full bloom	1·30
Purple vetch	18	Thin	Past bloom	1·00
Early Amber sugar cane	30	Thin	Not in head	0·74
Hog millet	22	Thin	Full bloom	0·58

Fifteen annual hay crops consisting of both single varieties and mixtures were sown on fallow on May 11. Where peas were used in a mixture with cereals for hay, the proportions used were two bushels of peas to one of cereal.

As in past years, oats exceeded other crops in yield, but barley, and barley and peas were very little below the oats in yield. Millets and similar crops, being slow to start, were in a green state when they were frozen on August 22. Both yield and quality of these crops were lowered by the frost.

ALFALFA—TEST OF VARIETIES

Comparative yields for a number of years. Sown alone on fallow.

Variety	First-year crop					Second-year crop		
	1924	1925	1926	1927	1928	1925	1926	1927
	tons	tons	tons	tons	tons	tons	tons	tons
Grimm Lyman	1·00	0·59	1·27	1·62	0·60	0·57	0·32	2·17
Grimm Brooks	0·89	0·45	1·06	1·56	0·76	0·70	0·53	1·80
Variegated	0·61	0·20	W.K.	1·51	0·43	0·65	W.K.	W.K.
Baltic	*	0·50	0·63	1·70	0·58	*	0·37	1·49
Cossack	1·69	0·46	0·95	1·72	0·45	0·97	T.W.	1·65
M. Falcato	2·57	*	*	1·56	0·43	1·52	*	W.K.
Liscomb	*	*	*	*	0·62	*	*	*
Ladak	*	*	*	*	0·69	*	*	*

*Not grown.
T.W.—Thin and weedy.
W.K.—Winter killed.
Yields given on a uniform basis of 12 per cent moisture content.

The alfalfa was affected by the long, dry period in the spring to the extent that the crop was generally short and thin, with considerable weeds in the thin areas. The crop was not able to recuperate even under the influence of June rains, as the plants had already advanced considerably in development, though still short.

SWEET CLOVER—TEST OF VARIETIES

1/100-acre plots—triplicated. Sown alone on fallow.

Variety	Height at harvest	Stand	Yield for 1928	Average yield 4 years
	in.		tons	tons
Grundy County	43	Thick	2·92	*1·90
Dwarf	40	Thick	2·88	1·85
Zouave	35	Thick	1·84	1·64
Arctic	41	Thick	2·84	1·60
Common White	39	Normal	1·76	1·55
Maccor	41	Thick	1·94	1·45
Yellow	27	Normal	1·88	1·39

*Three-year average.
Yield given on uniform basis of 12 per cent moisture content.

The sweet clover varieties withstood the spring drought better than most varieties of grass, although brome grass seeded under the same conditions produced about the same yield as the best varieties of sweet clover. It should be noted that the clovers listed in the table were sown without a nurse crop on fallow in 1927. Other lots of sweet clover seeded with nurse crops in 1927 produced much lower yields in 1928. With the latter method of sowing, there was no reserve of moisture in the soil to carry the clover through the spring drouth.

WESTERN RYE STRAINS

Sown alone on fallow. 1/100-acre plots. Quadruplicated.

Strain	Yield per acre	
	First year hay	Second year hay
	tons	tons
Commercial (Check)	1·46	0·76
Ottawa 7	1·42	0·78
Ottawa 10	1·45	0·57
Ottawa 14	1·35	0·73
Commercial (Check)	1·42	0·39
Ottawa 51	1·27	0·56
Ottawa 65	1·37	0·40
Ottawa 78	1·45	0·49
Commercial (Check)	1·58	0·40
Ottawa 96	1·54	0·43
Ottawa 99	1·63	0·68
Ottawa 124	1·70	1·04

NOTE.—Yields given on a uniform basis of 12 per cent mositure content.

Ten strains were sown alone on well-prepared fallow in quadruplicate plots for test of yield and quality of hay. Strain No. 124, which produced the highest yield, is a thick, erect-stemmed sort having a good percentage of leaf. No. 99, the second highest in yield, is also thick-stemmed but inclined to lodge. Numbers 10 and 51, though not so high in yield, produce hay of the finest quality in the test. The stems of these strains are slender and the leaves are generally narrow.

YIELDS OF VARIOUS GRASSES, LEGUMES AND MIXTURES GROWN WITH A NURSE CROP OF WHEAT

This experiment is carried out in a four-year rotation of (1) fallow (2) wheat (grass or clover seeded) (3) hay (4) hay. Where the growth warrants it two cuttings are made in the first season. In the second season only one cutting is taken and the land is ploughed immediately afterward in order that the grasses may be completely killed out in the fallow which follows.

YIELDS OF FIRST AND SECOND-YEAR HAY CROPS

Yields expressed in terms of cured hay on uniform basis of 12 per cent moisture content

Hay crop	1st year hay crop		2nd year hay crop	
	1928 per acre	Six-year average per acre	1928 per acre	Five-year average per acre
	tons	tons	tons	tons
1 Brome and western rye (check)	0·58	1·09	0·55	1·18
2 Brome grass	0·56	1·05	0·45	1·21
3 Western rye grass	0·49	1·29	0·46	1·31
4 Timothy	0·42	0·66	Failed	0·74
5 Brome and western rye (check)	0·50	1·01	0·52	1·15
6 Kentucky blue grass	Failed	0·42	0·56	0·45
7 Western rye and sweet clover	0·78	1·19	0·66	1·14
8 Brome and sweet clover	0·66	1·08	0·58	0·95
9 Brome and western rye (check)	0·61	1·31	0·48	1·23
10 W. rye and alfalfa	0·59	1·12	0·53	1·16
11 Grimm alfalfa	0·41	1·18	Failed	0·63
12 Variegated alfalfa	0·54	1·10	0·51	0·63
13 Brome and western rye (check)	0·60	1·05	0·52	1·03
14 Red clover	Failed	0·21	Nil	Failed
15 Yellow sweet clover	0·71	1·18	.....	.....
16 White sweet clover	0·86	1·14	.....	.....
17 Brome and western rye (check)	0·59	1·04	0·43	0·97

Apart from the few clovers and grasses which have not been hardy there have been no great differences in yields, among the better adapted grasses and legumes. Over the five-year period which this experiment has covered the western rye has been more consistent in producing a stand than any other single grass or clover. The mixtures of western rye and alfalfa and western rye and sweet clover have also done fairly well. The brome grass alone has at times produced high yields and at other times due to poor stands the yields have been low. On several occasions both sweet clover and alfalfa have failed to make satisfactory stands, hence these crops are more uncertain in this district than western rye grass. For that reason it is usually advisable to mix these legumes with western rye grass to increase the chances of getting a stand of some sort.

SUGAR BEETS—TEST OF VARIETIES FOR YIELD AND SUGAR CONTENT

Variety	Green weight	Dry weight
	tons	tons
Frederiksen	13·11	2·94
Dieppe	12·66	2·72
Bussezyuski	12·25	2·65

The analysis of sugar beets grown at this Station during the past three years shows the beets to have a fair sugar content of a rather low purity. In dry seasons, the beets are small and of inferior quality.

TESTS OF MISCELLANEOUS GRASSES
Sown without nurse crop on fallow

Grass	Yields in tons per acre first and second crops for four years							
	1925		1926		1927		1928	
	1st crop	2nd crop	1st crop	2nd crop	1st crop	2nd crop	1st crop	2nd crop
Timothy—Ohio	1·60	0·59	0·10	0·36	.....	1·36	.....	.....
Timothy—commercial	1·13	.....	0·49	0·28	1·60	1·36	0·29	0·30
Timothy—Boon	1·45	0·54	0·33	0·38	1·54	1·14	0·27	0·13
Red top	1·25	0·63	PC	TW	1·56	PC	0·31	0·24
Canadian blue	1·09	0·81	PC	TW	PC	PC	PC	PC
Kentucky blue	0·84	0·39	PC	0·29	PC	PC	PC	PC
Orchard grass	0·86	0·49	PC	TW	PC	PC	.....	PC
Meadow fescue—commercial	1·43	0·51	0·47	0·73	PC	0·96	.....	PC
Meadow fescue—C.E.F	.....	.....	TW	.....	0·98	1·29	PC	0·08
Perennial rye	WK	.....	WK	.....	WK	.....	WK	.....
Grazier	1·97	1·49	0·58	0·96	2·35	1·87	1·20	0·43
Western rye—C.E.F	2·31	1·38	0·60	0·88	2·29	1·58	1·04	0·43
Brome—commercial	2·13	1·39	0·45	0·89	1·86	1·44	1·21	0·40
Brome—C.E.F	.....	.....	0·48	.....	1·69	1·59	1·80	0·91
Tall oat grass	1·55	0·67	PC	PC	PC	PC	PC	PC
Crested wheat grass	.....	.....	.....	.....	.....	.....	1·82	.....

PC—Pour catch.
TW—Thin and weedy.
WK—Winter killed.

Yields of all grasses have been variable and most of them have yielded poorly. Some varieties have not withstood the winter and others for various reasons are not adapted to conditions prevailing here. The 1928 yields were light in most cases due to a rather poor catch of the 1927 seeding and to the extremely dry spring of 1928. Although the June rainfall was abundant it came too late to be of maximum value to most perennial hay crops.

POULTRY

Some improvement in the general condition of the Barred Rock flock has been made during the year. Every possible precaution was taken to brood and rear the chicks on land which had not been used previously for poultry with the result that this year's pullets are practically free from intestinal parasites. More attention has been given to the mating of cockerels and pullets of known ancestry and productivity to the end that high egg production, size of egg and other desirable qualities are being more firmly fixed in the flock.

In the hatching season four 240-egg incubators were used. A total of 2,160 eggs was set from which 1,325 chicks were hatched. Of these 700 were sold as day-old chicks. Of the 625 chicks kept on the Station nearly 600 reached maturity. One hundred and fifty pullets were selected to go into the laying pens and 30 cockerels were selected for breeding purposes. Of these cockerels 20 have been sold to farmers.

The following table shows the production record of some of the best pullets during the 1927-1928 laying season. All records are for one year from the date on which pullets began to lay.

PRODUCTION RECORDS OF PULLETS

Pullet	Number of eggs laid	Weight per dozen
		ounces
L 218	277	25
L 16	277	23
L 18	261	23
L 219	260	24
L 38	240	23
L 224	236	28
L 22	235	25
L 37	225	23
L 24	224	25
L 6	222	24
L 33	212	24
L 9	207	23

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